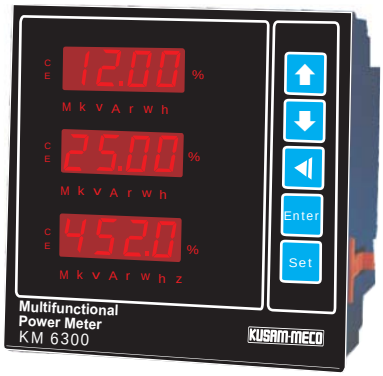
KUSAM-MECO®

MULTIFUNCTIONAL DIGITAL TRMS POWER METER

An ISO 9001:2008 Company

Model KM - 6300

Accuracy Class 0.25%



FEATURES :

Measurement of Current, Voltage, Active, Reactive and Apparent Power, Power factor, Line Frequency, Active & Reactive Energy, Harmonic, & Maximum Demand. (54 parameters).
High - brightness LED display
High accuracy up to 0.25 %
Programmable adjustment for current and voltage transformers ratio
With RS 485 or RS 232 output
Neutral current can be indicated
Dual relay contacts for energy or alarm output
Setting protected by password
Memory of all setting value and energy data over ten years.
Outside dimension compatible for DIN standard 144 x 144 mm
Optional Harmonic Display
Optional Dual current loop output.

SPECIFICATION :

Local Display	Total	Phase1	Phase2	Phase3	Accuracy **
L- L Voltage	*				0.25%
L- N Voltage					0.25%
Line current	*				0.25%
Neutral current					1%
Active power					0.5%
Reactive power					0.5%
Apparent power					0.5%
Power factor	*				0.5%
Frequency	*				0.05%
Active energy +					0.5%
Reactive energy +					0.5%
Active energy -					0.5%
Reactive energy -					0.5%
Total Harmonic - I(1)	*				2%
Total Harmonic - V(1)	*				2%

(1) up to 31 st harmonic * Average Value **Full scale of ranges

Accuracy Performance Range
Current range.....2 ~ 120 %
Voltage range .....2 ~ 120 %
Power range.....Current, 2 ~ 120 %, Voltage, 2~120 %
Power factor range.....Cos (sin)0.5 ~ 1
Frequency range.....45 ~ 70 Hz
Distortion level from.....10 % to 120 %

Input Voltage
Voltage range (line to line).....8 ~ 500 V
Voltage range (line to neutral).....5 ~ 290 V
Maximum overload.....750 V
Input impedance..... 200.K.

Input Current.
Current range.....5 A or 1 A
Maximum overload.....6 A, continuous, 50 A 5 sec.
. 15 A, continuous, 250 A 1 sec. (Option)
Input burden..... 1VA
Isolation.....Each phase, 600 V
Starting current.....1 %, F.S.

Power Supply
Nominal voltage .....AC 110 V / 220 V ± 15 %, 50 / 60 Hz
or DC 110 V, 24 V ± 10 %
Burden.....(AC) 5 VA, (DC) 5 W

Display
Type.....High-brightness RED LED
Digital height..... .....0.56", 14.2 mm
Digital format..... 3 rows of 4 digits
Digits for Wh, Varh, Vah.....8 digits (two rows)

All Specifications are subject to change without prior notice

MULTIFUNCTIONAL DIGITAL TRMS POWER METER - Model KM 6300

RELAY CONTACTS OUTPUT FOR ENERGY OR ALARM

Energy Value.....100 pulse for 1 K Wh or 1 KVarh

Alarm set point .....2 point, programmable

Relay contacts .....AC 240 V 1 A, DC 24 V 1 A

DEMAND

Actual demand with time into period.....A, VA, W Var

Time of period.....1 ~ 60 min. programmable

Real time clock (option).....HH / MM / SS

Max. Demand.....A, VA, W, Var

ANALOG OUTPUT (OPTIONAL)

Current loop.....11 ~ 32 V, DC 4 ~ 20 mA

Output resistance.....600 (24V DC)

Output points..... 2 points, programmable

Output accuracy.....± 0.5 % RO.

HARMONICS DISPLAY (OPTIONAL)

Total Harmonics (Current) upto 31st Harmonic (Display upto 15th)

Total Harmonics (Voltage) upto 31st Harmonic (Display upto 15th)

COMMUNICATION

Interface.....RS - 485 (standard), or RS232 (option)

Protocol.....MODBUS, RTU

framing

Baud rate..... 1200 ~ 38400 programmable

Address range.....1 ~ 255 programmable

Data format.....N.8.1 / N.8.2 / 0.8.1 / E.8.1 pro.

Number of meter.....up to 32 on standard RS - 485

GENERAL

Dielectric strength..... IEC 688 , AC 2 . 3 KV 1 minute

between Input / Output / Power

AC 2.8 KV 1 minute between all terminal / ground

Operating temperature.....0 ~ 60°C

Storage temperature.....-10 ~ 70°C

Temperature coefficient..... 100 PPM / °C

Max. Humidity.....95.% RH

ELECTROMAGNETIC COMPATIBILITY

Withstanding impulse voltage.....IEC 1000 -4 - 5

Electrical transient in burst.....IEC 1000 - 4 - 4

Electrostatic discharge.....IEC 1000 - 4 - 2

Electromagnetic fields immunity.....IEC 1000 - 4 - 3

Wave damping .....IEC 255 - 4

ORDERING INFORMATION

K M 6300 - [ ] [ ] [ ] [ ] [ ]

Model

Input current
1 : 1 A
5 : 5 A
0 : Option

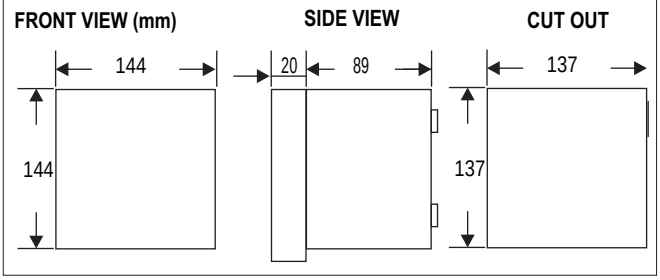
Aux. power supply
1 : AC 110 V / 220 V
A : DC 110 V
C : DC 24 V

RS 485 output
Y : Yes
N : No

Analog output
Y : Yes
N : No

Harmonic
Y : Yes
N : No

DIMENSION :



All Specifications are subject to change without prior notice

KUSAM-MECO®
An ISO 9001:2008 Company

G-17, Bharat Industrial Estate, T. J. Road, Sewree (W), Mumbai - 400 015. INDIA.
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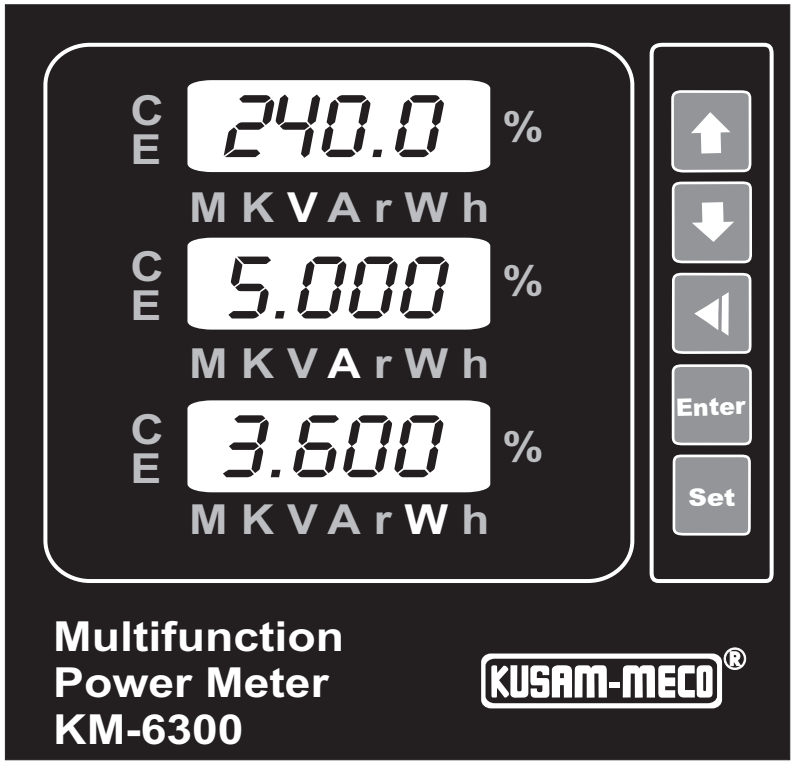
Fax: 91-22-2414 9659 **Email :** kusam_meco@vsnl.net
Website: www.kusamelectrical.com, www.kusam-meco.co.in

KM 6300



INSTRUCTION MANUAL

KUSAM-MECO®

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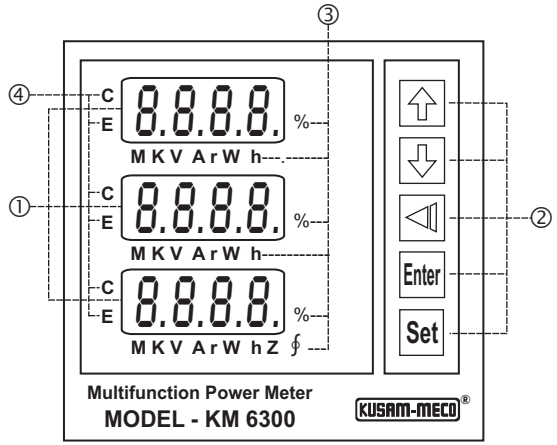
TRANSPACIFIC CERTIFICATIONS LTD TCL JAS-ANZ
ISO 9001:2008
Quality Management System
Cert. No. 6987

INDEX

1. FRONT PANEL

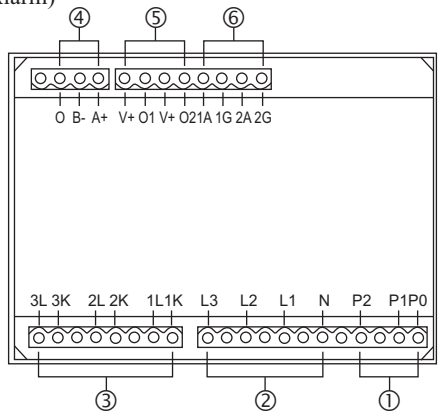
1.1 KEYS FUNCTION :

① DISPLAY: 3 rows of 4 digits (7 segments)
② KEYS: 5 membrane push buttons
③ LAMP: Parameter units and harmonic components in %
④ C, E LAMP: Polarity distinction



1.2 TERMINALS :

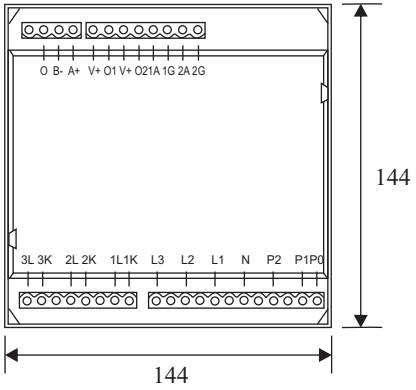
① Power Supply
② Voltage Connection
③ Current Connection
④ Communication Interface Via RS 485
⑤ Analog Output (Loop Powered)
⑥ Relay Output (Pulse or Alarm)



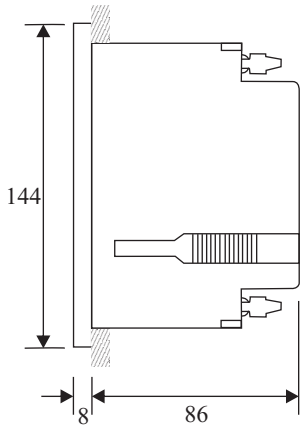
2. INSTALLATION AND WIRING CONNECTION

2.1 OVERALL DIMENSIONS AND PANEL CUT-OUT : Unit in mm

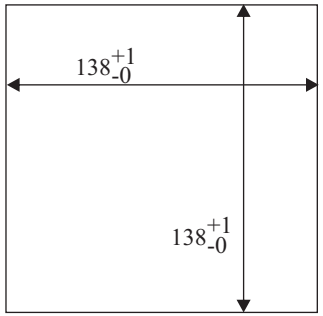
Back View



Side View

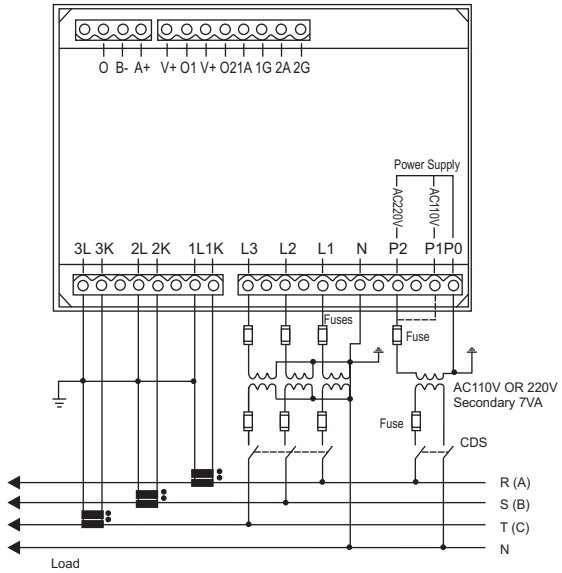


Cut-Out

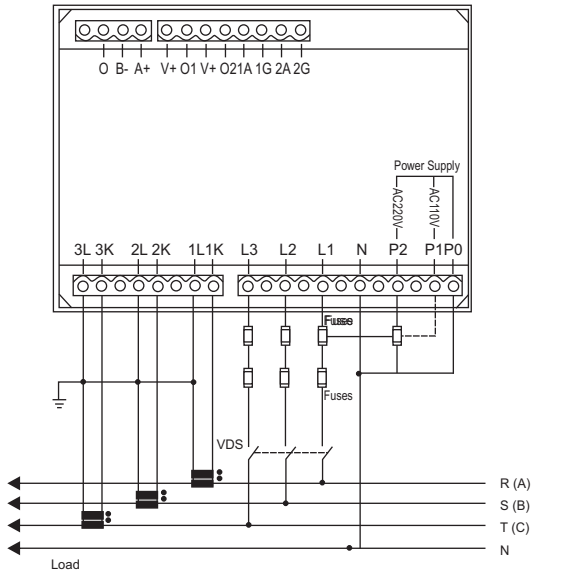


2.2 WIRING CONNECTION : This connection has to conform to the presetting wiring network under the scrolling menus SEt → SYS nEt

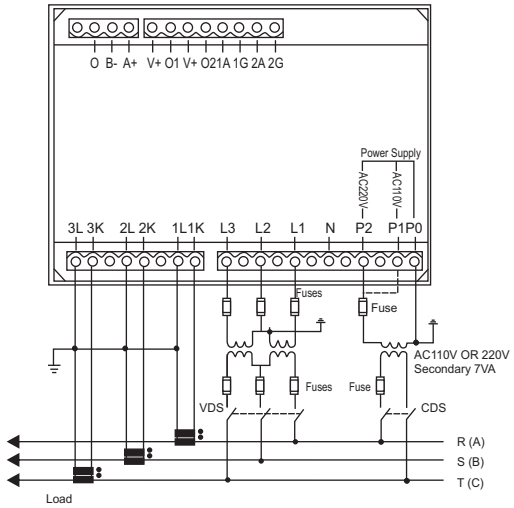
3 Phase 4 Wire : 3 PTs and 3 CTs. SYS nEt = 3P4L



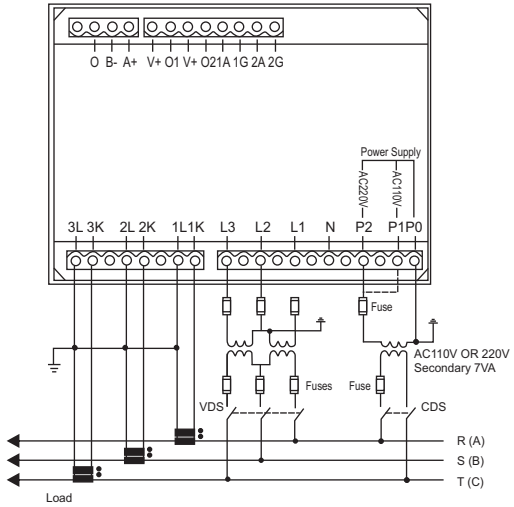
3 Phase 4 Wire : 3 CTs SYS nEt = 3P4L



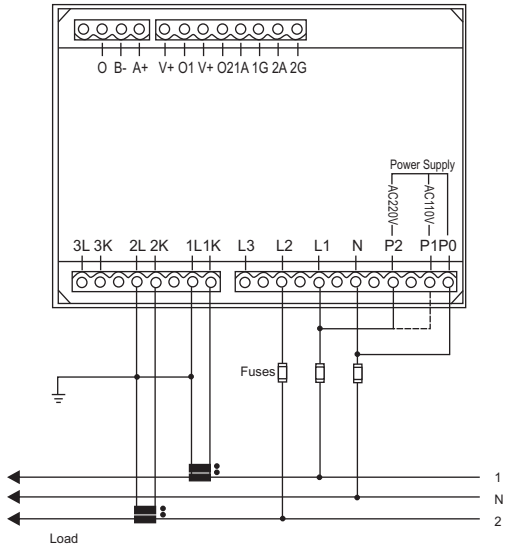
3 Phase 3 Wire: 2 PTs and 3 CTs. SYS nEt = 3P3L



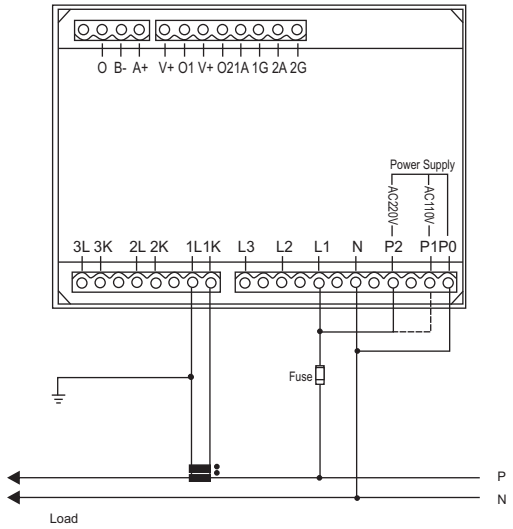
3 Phase 3 Wire: 2 PTs and 2 CTs. SYS nEt = 3P3L



Single Phase 3 Wire: 2 CTs. SYS nEt = 1P3L



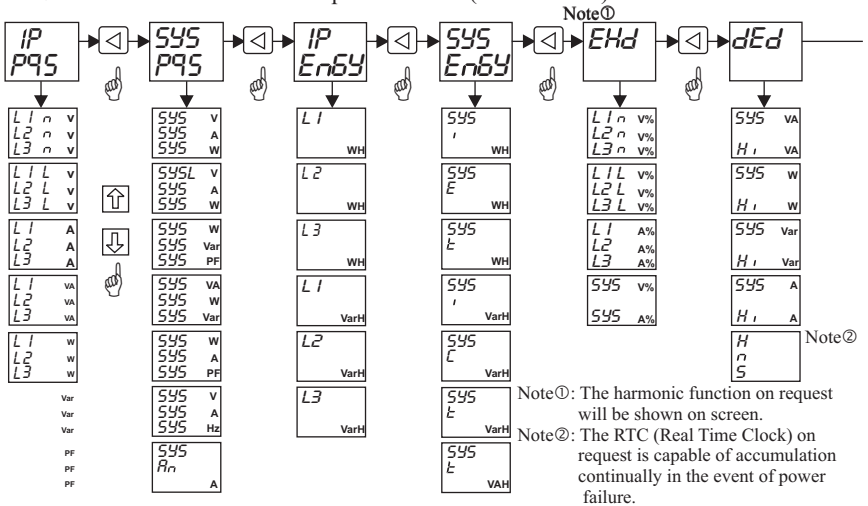
Single Phase 2 Wire: Only 1CTs. SYS nEt = 1P2L



3. CONFIGURATION\ MENUS

3.1 FLOWCHART OF DIFFERENT WIRING NETWORKS : The keys function refers to page 14. There are four configuring flowcharts according to the presenting wiring networks under the scrolling menus (SYS nEt) as follows.

3P3L : 3 Phase 4 Wire SYS v represents volts (Line-Neutral)

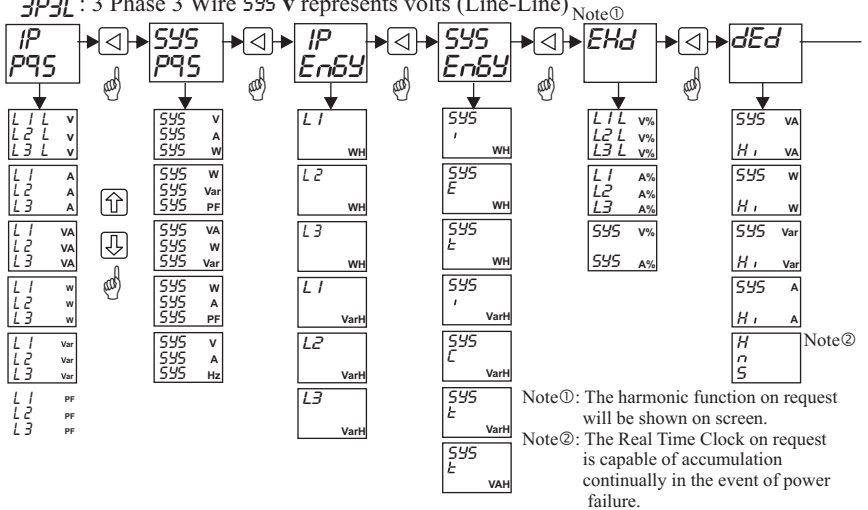


Note①: The harmonic function on request will be shown on screen.

Note②: The RTC (Real Time Clock) on request is capable of accumulation continually in the event of power failure.

Note③: The optional parameters shown on screen can be selected by your request (see page 15)

3P3L : 3 Phase 3 Wire SYS **v** represents volts (Line-Line)

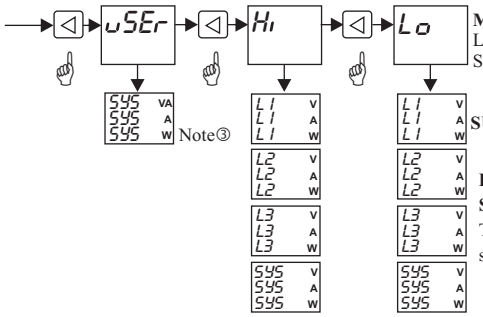


Note①: The harmonic function on request will be shown on screen.

Note②: The Real Time Clock on request is capable of accumulation continually in the event of power failure.

Note③: The optional parameters shown on screen can be selected by your request (see page 15)

You will see the parameter values of first menu under the Subsidiary Flowchart after leaving Main Function Mode.



MAIN FUNCTION MODE : ◁ Go to the next menu
Long Press : Displaying screen continues in cycle
Short Press : Displaying screen continues step by step.

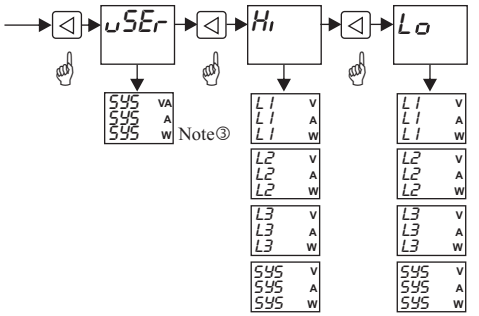
SUBSIDIARY FLOWCHART : ⇧ Go to the former page
⇩ Go the next page

Long Press : Displaying screen continues in cycle
Short Press : Displaying screen continues step by step.
The values of the selected parameter will be shown on screen after releasing ⇧ or ⇩.

In Hi & Lo Setting Mode
Eliminate The Stored Values :
Press E ◁ simultaneously, the legend CLr will be displayed on screen for eliminating your presetting values during the measured parameter values shown on screen.

Power-On Selection :
As the measured parameter values are shown on screen, press S E simultaneously until the legend ChG is displayed on screen, and then the selected parameters will be set to the desired displaying page once this meter is re-switched on.

S : Set E : Enter

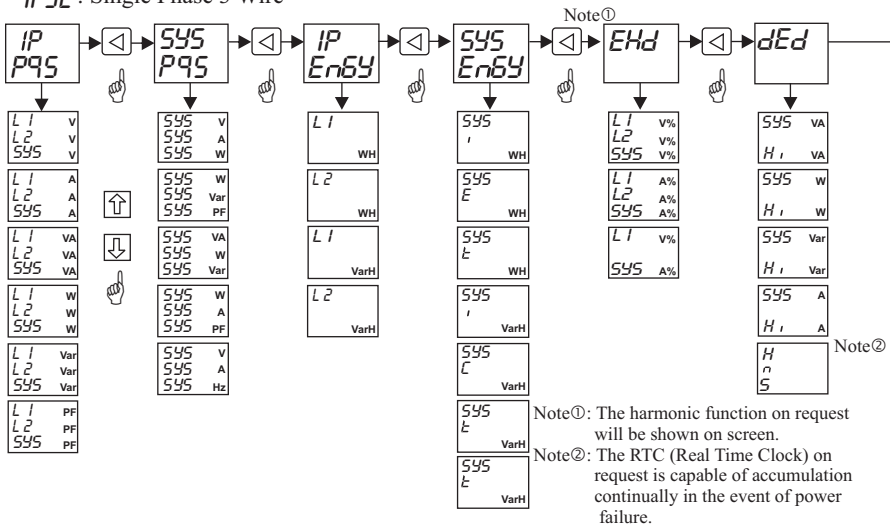


MAIN FUNCTION MODE

SUBSIDIARY FLOWCHART

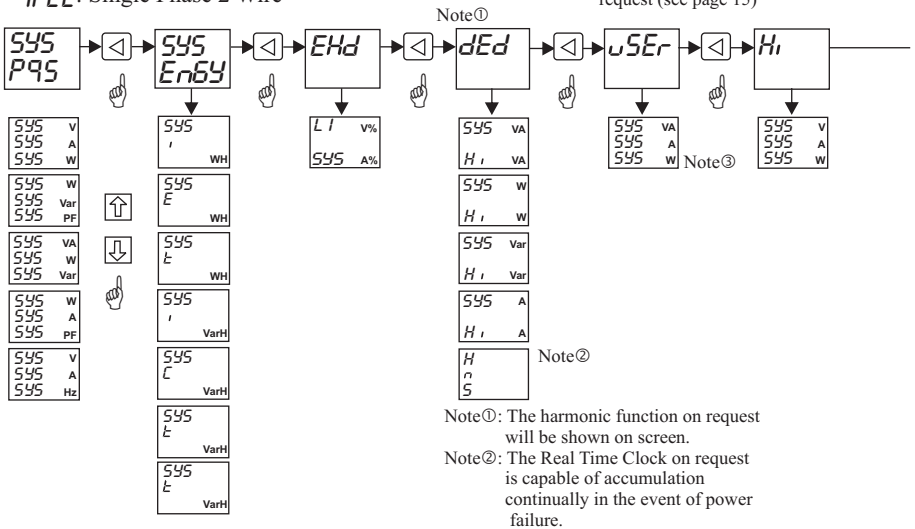
3.1 FLOWCHART OF DIFFERENT WIRING NETWORKS : The configuring flowcharts is according to the presetting wiring networks under the scrolling menus SYS nEt as follows.

IP3L : Single Phase 3 Wire



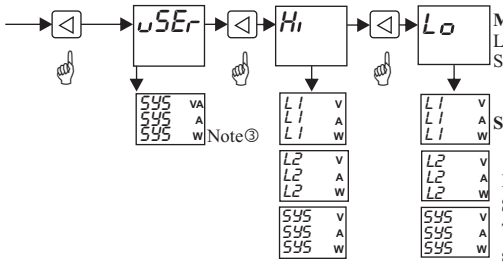
Note①: The harmonic function on request will be shown on screen.
Note②: The RTC (Real Time Clock) on request is capable of accumulation continually in the event of power failure.
Note③: The optional parameters shown on screen can be selected by your request (see page 15)

IP2L : Single Phase 2 Wire



Note①: The harmonic function on request will be shown on screen.
Note②: The Real Time Clock on request is capable of accumulation continually in the event of power failure.
Note③: The optional parameters shown on screen can be selected by your request (see page 15)

You will see the parameter values of first menu under the Subsidiary Flowchart after leaving Main Function Mode.



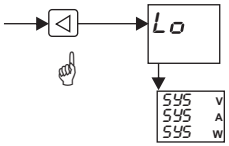
MAIN FUNCTION MODE : ◁ Go to the next menu
Long Press : Displaying screen continues in cycle
Short Press : Displaying screen continues step by step.

SUBSIDIARY FLOWCHART : ⇧ Go to the former page
⇩ Go the next page
Long Press : Displaying screen continues in cycle
Short Press : Displaying screen continues step by step.
The values of the selected parameter will be shown on screen after releasing ⇧ or ⇩.

In Hi & Lo Setting Mode
Eliminate The Stored Values :
Press E ◁ simultaneously, the legend CLr will be displayed on screen for eliminating your presetting values during the measured parameter values shown on screen.

Power-On Selection :
As the measured parameter values are shown on screen, press S E simultaneously until the legend ChG is displayed on screen, and then the selected parameters will be set to the desired displaying page once this meter is re-switched on.

S : Set E : Enter



3.2 DESCRIPTION OF FUNCTIONS FLOWCHART

DESCRIPTION OF MAIN FUNCTION MODE :

Per Phase : **V, A, VA, W, Var, PF**

System : **V, A, VA, W, Var, PF, Hz**
(On Single or Three phase)

Per Phase : **WH, VarH** (Total integrated value on each phase)

Total System :
WH(i), (E), (t)
VarH(I), (c), (t)
VAH(t)

WH
I : IMPORT (kWh is positive
E : EXPORT (kWh is negative)
T : TOTAL (The sum of total real energy

VarH
I : Imported (kVarh is positive
C : Imported (kVarh is negative
T : TOTAL (The sum of total real energy

The Calculation Formula : **VTHD, ATHD**

$$THD = \sqrt{\frac{\mathbf{Vrms^2 - V_{(1)}rms^2}}{\mathbf{Vrms^2}}} \quad 100\%$$

Maximum Demand : The latest stored peak values in selected parameters such as VA, W, VAr, A.

Optional Selection For Three Required Parameter Values : Please refer to page 15.

Store Peak Value :

Store Vally Value :
V, A, W, on single phase or system network

Note①: The harmonic function on request will be shown on screen.

DESCRIPTION OF SUBSIDIARY FLOWCHART :

DESCRIPTION OF EACH FLOWCHART :

L1 : All parameter values measured on phase L1
L2 : All parameter values measured on phase L2
L3 : All parameter values measured on phase L3
SYS : All parameter values measured in system network.

VOLTS : On each phase
n : Line-Neutral L : Line-Line
SYS : 3 Phase 4 Wire, it represents volts on (Line-Neutral)
3 Phase 3 Wire, it represents volts on (Line-Line)

Real / Reactive Energy in SYS :
SYS ı : Imported Real Energy (Positive) & Imported Reactive Energy (Positive)
SYS E : Real Energy (kWh) is negative
SYS C : Reactive Energy (kVar) is negative
SYS t : The sum of integrated absolute value

STORE VALUES :
Hı : Store peak value
Lo : Store valley value

DESCRIPTION OF EACH LEGEND :

M : The displaying values multiplied by 10^6
K : The displaying values multiplied by 10^3
Note : Auto-adjustment via the CTs & PTs ratio

DESCRIPTION OF UNIT LAMP IN C AND E :

C : Var on PF is capacitive (Negative)
E : Exported Watts (Negative)

EACH PARAMETER LAMP :

V : Volt
A : Amp
W : Watt
Var : Reactive Power
Wh : Real Energy (kWh)
Hz : Frequency
ϕ : Power Factor (PF)

DESCRIPTION OF EXAMPLES

: The sum of kWh values on phase L1

: System Positive kWh

: System Negative kWh

: Total kWh In System

: Negative kWh In System

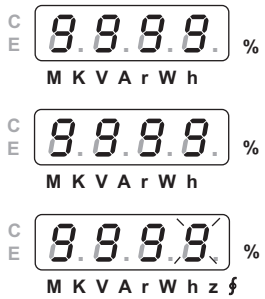
: System Volts & Amps With THD Components

: System kW demand
Store Max Demand

: Real Time Clock :
Hour, Minute, Second
(The RTC function is on request)

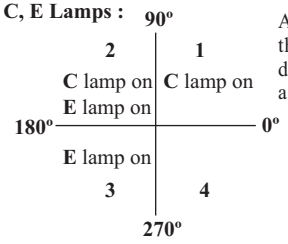
3.3 DESCRIPTION OF DISPLAYING VALUE

Display Screen :



Display : 3 rows of 4 digits LED, max. value reaches 9999.
Decimal Point : The decimal point position will automatically be varied with the different ratio of CT and PT. Please refer to chapter 3.3.1
Parameter Lamps : A variety of electrical units.

C, E Lamps :



An included angle between the volt (Regarded as a datum point) and amp creates a divided four quadrants.

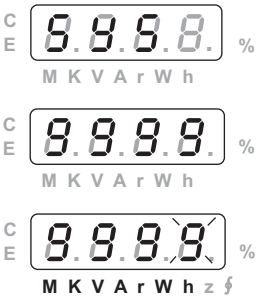
3.3.1 DESCRIPTION OF M / K UNIT :

Auto-Adjustment In Decimal Point Position And M / K Unit : Presetting scaling values on single phase is multiplied by each ratio of the CT and PT.
Display Values Are Bigger Than Scaling Values : According to the scaling values to calculate its decimal point position and M / K unit.
Display Values Are Smaller Than Scaling Values : Recalculate its decimal position and M / K unit.

Example : 240V, 5A, 1200W [Single Phase]

PT Ratio	CT Ratio	Full Scale Value	Secondary Value	Display Value	Unit Lamp
1	1	240V	240W	240.0	V
1	1	240V	50V	050.0	V
1	1	5A	5A	5.000	A
1	1	5A	100mA	0.100	A
1	1	1200W	1000W	1.000	KW
1	1	1200W	200W	0.200	KW
1	1	3600W (3)	3000W (3)	3.000	KW
1	1	1200Var	500Var	0.050	KVar
1	**2**	**10A**	**5A**	**10.00**	A
1	**2**	**10A**	**4A**	**8.000**	A
1	1000	5000A	5A	5000	A
1	2000	10KA	5A	10.00	KA
5	80	1200V	240V	1.200	KV
5	80	1200V	50V	0.250	KV
5	80	400A	5A	400.0	A
5	**80**	**1440KW (3)**	**3000W (3)**	**1.200**	**MW**
5	**80**	**480KW**	**1000W**	**400.0**	**KW**
5	80	480KW	200KW	080.0	KW
5	80	480KW	50Var	020.0	Kvar

Real/Reactive Energy Display :



Display : 2 rows of 4 digital LEDs, max. value reaches 9999999999.
Decimal Point Position Of M/K Unit : Derived from the scaling values in VA and each presetting ratio of CT and PT.
Parameter Lamps : A variety of electrical units.

3.3.2 DESCRIPTION OF M/K UNIT

Based on the scaling values in VA on system x the CT and PT ratio x 300 days. Displaying values are higher than 999999999, it will be automatically set to 0 [No consideration to any adjustment in decimal point position and M/K Unit].

Example : 240V, 5A, 3600VA [system]
3600 x 300 (Day) x 24 (Hour) = 25920000

PT Ratio	CT Ratio	Scale Value	Accumulative Value by 300 days	Decimal Point	Unit Lamp
1	1	3600W	25920000	00000.000	KWH
1	1	3600Var	25920000	00000.000	KvarH
1	1	3600VA	25920000	00000.000	KVAH
10	1	36000W	259200000	000000.00	KWH
1	10	3600W	259200000	000000.00	KWH
10	20	720000W	5184000000	0000000.0	KWH
10	40	1440000W	10368000000	00000000	KWH
100	40	14400000W	103680000000	000000.00	MWH

3.4 KEYS OPERATION

DISPLAY ELECTRICAL PARAMETERS : Please refer to page 6

KEYS FUNCTION : [S] : Set [E] : Enter

[⇧] Go to the former page

[⇩] Go to the next page

Long Press : Displaying screen continues in cycle.
Short Press : Displaying screen continues step by step.
The values of the selected parameters will be shown on screen after releasing [⇧] or [⇩].

[◁] Go to the next menu under the Main Function Mode.
Long Press : Displaying screen continues in cycle.
Short Press : Displaying screen continues step by step.
You will see the parameter values of first menu under the Subsidiary Flow Chart after releasing.

[E] Remind users which menu in the Main Function Mode is.

[S] Enter Set-Up Mode, please refer to page 16.

[S] [E] Press both buttons simultaneously.
Specific Selection For Displaying Required Parameters On Screen As Re-switching.
The Meter On : Press both buttons simultaneously to wait for one second until the legend CHG is appeared.

In Hi & Lo Setting Mode

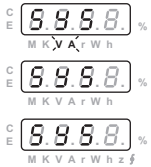
[E] [◁] Eliminate The Stored Presetting Values : Press [E] [◁] simultaneously to wait for one second until the legend Clr is appeared.

OPTIONAL OPERATION : For the following two functions

1. The "**USER**" MENU UNDER THE MAIN FUNCTION MODE :

Change the desired 3 parameters by entering "USER" menu under the Main Function Mode.

[E] [◁] The selected parameters will be flashed while pressing both [E] [◁] simultaneously.

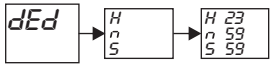


[◁] Change the desired parameters at top, middle and bottom line, the desired parameters will flash while pressing.

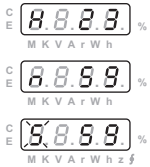
[⇧] [⇩] Go to the top, middle and bottom line.

[E] The desired parameters won't be stored until the legend CHG is appeared.

2.REAL TIME CLOCK (**RTC**) SET-UP : **H** : hour, **n** : minute, **S** : second
(It must install a RTC device on S6-300 that can accumulate the real time by means of an internal lithium battery in the event of power failure.)



[E] [◁] The selected legends will be flashed while pressing [E] [◁] simultaneously.



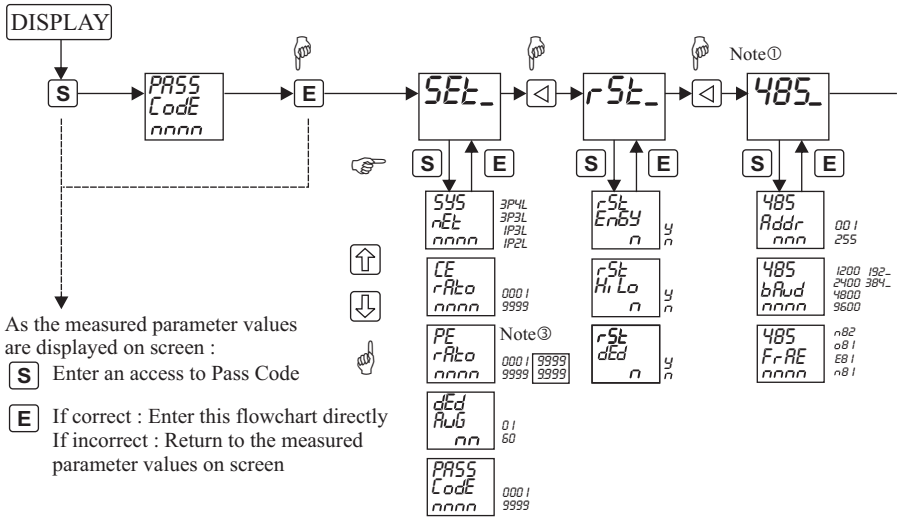
[◁] Change the desired legends in hour, minute and second, the desired legends will flash while changing.

[⇧] [⇩] Alter the desired values as your request.

[E] Press it for one second, the desired values won't be stored until the CHG is appeared.

4. FLOWCHART OF RELATED FUNCTIONS SET-UP, DESCRIPTION OF KEYS

4. FLOWCHART OF RELATED FUNCTIONS SET-UP [S] : Set [E] : Enter



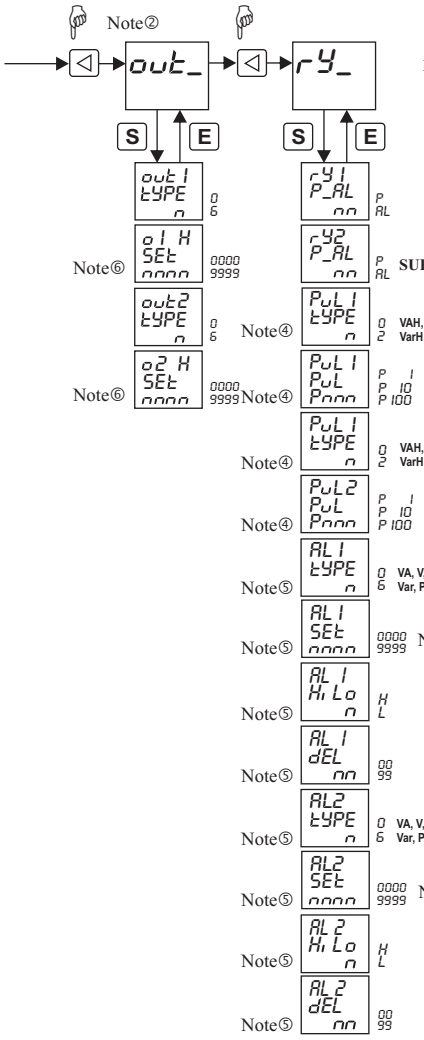
As the measured parameter values are displayed on screen :

[S] Enter an access to Pass Code

[E] If correct : Enter this flowchart directly
If incorrect : Return to the measured parameter values on screen

Note① : The RS485 required, the legend 485 will be appeared on the flowchart.
Note② : The output required, the legend ouE will be appeared on the flowchart.
Note③ : Press [E] [◁] simultaneously to set or cancel the decimal point position as the values are in setting.
Note④ : The legend P_AL in Pulse Mode will be appeared on the flowchart as you select P.
Note⑤ : The legend P_AL in Alarm Mode will be appeared on the flowchart as you select AL.
Note⑥ : The decimal point position will be varied with the CT & PT ratio separately. Besides, you have to alter the presetting values if the tYPE or the CT & PT ratio is already changed.

KEYS OPERATION



MAIN FUNCTION MODE :

[◁] Go to the next menu
[E] Return to the measured parameter values on screen
[S] Access to the Subsidiary Flowchart

SUBSIDIARY FLOWCHART :

[⇧] Go to the former page
[⇩] Go to the next page
[E] Return to the Main Function Mode
[S] Enter to set to the desired values (keep flashing)

SETTING VALUES :

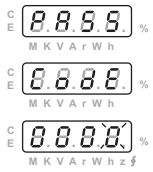
[⇧] Alter the desired values
[⇩] Alter the desired values
[◁] Alter digit position
[E] Confirm by pressing E and then return to the Subsidiary Flowchart

4.2 DESCRIPTION OF VALUES SET-UP : [S] : Set [E] : Enter

FLOWCHART OF RELATED FUNCTIONS SET-UP, Please refer to Page 16

Access To Pass Code : Set as *1000* by factory

Range : *0000 - 9999*



Alter the desired values

Alter the desired values

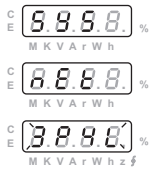
Alter digit position

Confirm by pressing.
If correct, access to the Main Function Mode; If incorrect, the legend *Err* will be shown on screen and then return to the measured parameter values on screen.

SEt_Main Function Mode : [S] access to values set-up, the selected legend keeps flashing

Type Of Network Set-Up : *3P4L* (Preset by factory) "Any setting in wiring connection on S6-300 has to confirm to the network system.

Range : *3P4L, 3P3L, 1P3L, 1P2L*



Alter the desired selection

Alter the desired selection

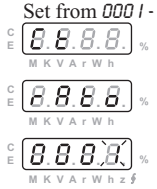
No function

Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

Setting The CT Ratio : Set as *0001* by factory

The Ratio Of Initial To Secondary Value :

Set from *0001 - 9999*



Alter the desired values

Alter the desired values

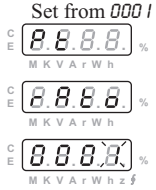
Alter digit position

Confirm by pressing. and then return to the Subsidiary Flowchart, the selected legend won't flash.

Setting The PT Ratio : Set as *0001* by factory

The Ratio Of Initial To Secondary Value :

Set from *0001 - 9999* or *0001 - 9.999*



Alter the desired values

Alter the desired values

Alter digit position

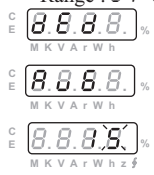
Confirm by pressing and then return to the Subsidiary Flowchart,

[E] [◁] Set or cancel the decimal point.

*The stored values in **HiLo** Mode and max. demand function will be cleared automatically after the CT & PT ratio is already changed.

Setting Average Time Of Max. Demand : Set as *15* minutes by factory

Range : *01 - 60* minutes



Alter the desired values

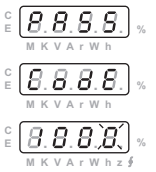
Alter the desired values

Alter digit position

Confirm by pressing. and then return to the Subsidiary Flowchart, the selected legend won't flash.

Pass Code : Set by users

Range : *0000 - 9999*



Alter the desired values

Alter the desired values

Alter digit position

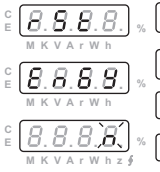
Confirm by pressing. and then return to the Subsidiary Flowchart, the selected legend won't flash.

*Preset as 1000 by factory is still valid for operation won't flash.

rSt_ Main Function Mode : [S] Access to values set-up, the selected values keep flashing

Accumulating Energy Set to Zero : *Y* set to zero

Range : *Y, n*



Change to the next selection

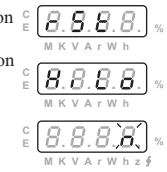
Change to the next selection

No function

Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash. The legend *CLr* shown on screen represents clearing

Clearing Peak (Hi) And Valley (Lo) Values In Energy : *Y* clear

Range : *Y, n*



Change to the next selection

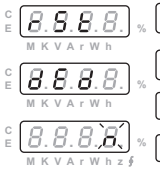
Change to the next selection

No function

Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash. The legend *CLr* shown on screen represents clearing

Clearing Peak (Hi) And Valley (Lo) Values In Max. Demand : *Y*

Range : *Y, n*



Change to the next selection

Change to the next selection

No function

Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.
CLr shown on the screen represents as clearing

!! Before altering all setting values in CT & PT ratio or type of network, you have to clear all values in accumulative integration!!

* Remarks :

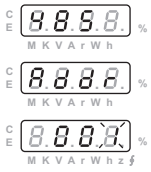
1. The integrated values will not be reset to zero automatically after altering the CT & PT ratio. Therefore, users have to take notice of integrated values whether they are reset to zero or not.
2. Clearing the presetting values in Hi & Lo set-up can be also performed on screen displaying the measured parameter values, please refer to page 6.

485_ Main Function Mode : (S) Access to values set-up, the selected values keep flashing

*The RS485 required, the legend 485- will shown on the flowchart, otherwise it won't appeared.

Communication Address :

Range : 001 - 255



Alter the desired values

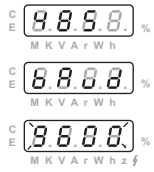
Alter the desired values

Alter digit position

(E) Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

Baud Rate : Set as 9600 by factory

Range : 1200, 2400, 4800, 96000, 192_, 384_



Alter the desired values

Alter the desired values

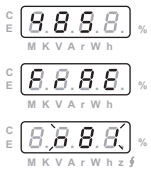
Alter digit position

(E) Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

*192_ : 19200
384_ : 38400

Data Frame : Set as n81 by factory

Range : n82, o81, E81, n81,



Alter the desired values

Alter the desired values

Alter digit position

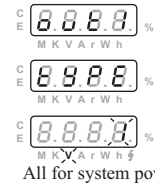
(E) Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

out_ Main Function Mode : (S) Access to values set-up, the selected values keep flashing

*The output required, the legend will be appeared on the flowchart

First Relay Setting : Set as 1 : **V**

Range : 0 - 6 lamp for the selected parameter will be on



Alter the next output

Alter the next output

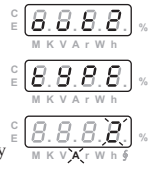
Alter digit position

(E) Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

All for system power parameters

Second Relay Setting : Set as 2 : **A**

Range : 0 - 6 lamp for the selected parameter will be on



Alter the next output

Alter the next output

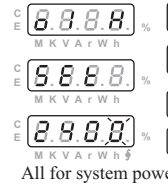
Alter digit position

(E) Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

*On 3P4L network represents Vn; On 3P3L network represents VVL

Setting Peak Value For The First Relay : Set as 2100 by factory

Range : 0000 - 9999 (parameter units and decimal point will be changed automatically)



Alter the next output

Alter the next output

Alter digit position

(E) Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

All for system power parameters

Setting Peak Value For The Second Relay : Set as 5000 by factory

Alter the next output

Alter the next output

Alter digit position

(E) Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

All for system power parameters

***Note :**

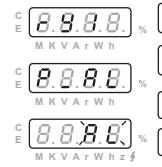
1. Values set-up : The full scale of output at 20mA is proportional to the fed input as 240.0V
2. VA, V, A, Hz : The designed output is by an example of 4-20 mA (single-limit) but not 4-12-20mA (dual-limits)
3. W : The designed output is by an example of 4-20mA (single-limits)
4. Var : The designed output is by an example of 4-12-20mA (dual-limits), the analog output 12-20mA is regarded as +Var, 12-4mA is regarded as -Var and 12mA is regarded as 0Var.
5. PF : The designed output is by an example of 4-12-20mA (dual-limits), the value at (1.00) in PF is set as 12-20mA, the value at (-1) in PF is set as 12-4mA, the value at (1) in PF is set as 12mA. If the value in PF is set to 0.500. the value in PF between 1 and 0.5 is proportional to 12-20mA, and the value in PF between 1 and -0.5 is proportional to 12-4mA, meanwhile, PF:1 regarded as 12mA.
6. Unit lamps and decimal point will be automatically varied (calculation) with the increment or decrement of CT & PT ratio.
7. With care of your setting for wiring connection in system voltage, an example of 3P4L : 240.0, 3P3L : 415.6, 1P2L : 480.0, IP2L : 240.0
8. The selected type of parameter unit and the setting value must be resent if the presetting type of parameter unit and the presetting value have been changed.
9. The ratio of CT, PT and the setting value must be resent if the presetting CT & PT ratio and the presetting value have been changed.

*Setting Examples : The output range is set to 4-20mA

1. SYS net set to 3P4L, I/P:0-240V (Phase-Voltage), O/P:DC 4-20mA
   Out1 tyPE is set to 1 (V), o1H SEt is set to 240.0
2. SYS net is set to 3P3L, I/P:0-380V (Line-Voltage), O/P:DC 4-20mA
   Out1 tyPE is set to 1 (V), o1H SEt is set to 380.0V
3. I/P: 0-5A, O/P:DC 4-20mA
   Out1 tyPE is set to 2 (A), o1H SEt is set to 5.000A
4. I/P:0-3000W, O/P:DC 4-20mA
   Out1 tyPE is set to 3 (W), o1H SEt is set to 3.000KW
5. I/P:-0.2-1.0-0.2, O/P: DC 4-20mA
   Out1 tyPE is set to 5 (PF), o1H SEt is set to 0.200 PF
6. CT ratio : 100 times, I/P: 0-300KW, O/P:DC 4-20mA
   Out1 tyPE is set to 3 (W), o1HSE is set to 300.0KW.

rY_ Main Function Mode : [S] Access to values set-up, the selected values keep flashing

First Relay Setting : Preset as AL by factory
Range : P, AL P : Pulse AL : Alarm



[⇧] Alter the next selection

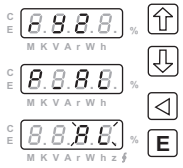
[⇩] Alter the next selection

[◁] No function

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

* P: Designed as Pulse output
AL: Designed as Alarm output

Second Relay Setting : Preset as AL by factory
Range : P, AL P : Pulse AL : Alarm



[⇧] Alter the next selection

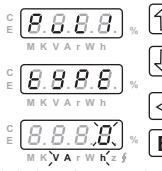
[⇩] Alter the next selection

[◁] No function

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

* P: Designed as Pulse output
AL: Designed as Alarm output

Setting First Relay For Type Of Pulse Output :
Preset as 0 : **VAH** by factory
Range : 0 - 2 Lamp for the selected parameter will be on



[⇧] Alter the next selection

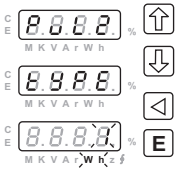
[⇩] Alter the next selection

[◁] No function

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

*The legend P.AL must be set to P in type of rY1
All for system power parameters (Total)

Setting Second Relay For Type Of Pulse Output :
Preset as 1 : **WH** by factory
Range : 0 - 2 Lamp for the selected parameter will be on



[⇧] Alter the next selection

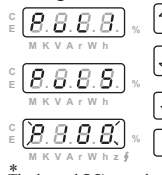
[⇩] Alter the next selection

[◁] No function

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

*The legend P.AL must be set to P in type of rY2
All for system power parameters (Total)

First Relay Output Creates Pulse Rate :
Preset as P 100 by factory
Range : P 1, P 10, P 100 System parameters (Total)



[⇧] Alter the next selection

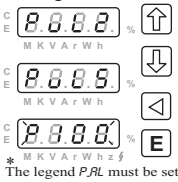
[⇩] Alter the next selection

[◁] No function

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

* The legend P.AL must be set to P in type of rY1
P100 : 100P/1KWH

Second Relay Output Creates Pulse Rate :
Preset as P 100 by factory
Range : P 1, P 10, P 100 System parameters (Total)



[⇧] Alter the next selection

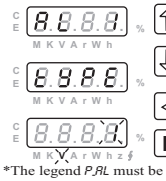
[⇩] Alter the next selection

[◁] No function

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

* The legend P.AL must be set to P in type of rY2
P100 : 100P/1KH

First Alarm Output Set To Which Parameter : Present 1 : **V**
Range : 0 - 6 Lamp for the selected parameter will be on



[⇧] Alter the next selection

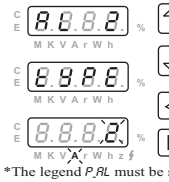
[⇩] Alter the next selection

[◁] No function

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

*The legend P.AL must be set to P in type of rY1
All for system power parameters (Total)

Second Alarm Output Set To Which Parameter : Present 2 : **A**
Range : 0 - 6 Lamp for the selected parameter will be on



[⇧] Alter the next selection

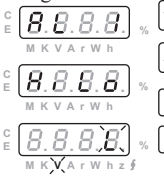
[⇩] Alter the next selection

[◁] No function

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

*The legend P.AL must be set to P in type of rY2
All for system power parameters (Total)

Setting Hi & Lo Level For First Alarm Output :
Preset as L
Range : H, L



[⇧] Alter the next selection

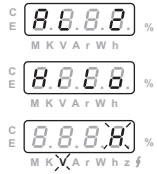
[⇩] Alter the next selection

[◁] No function

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

* The legend P.AL must be set to AL in type of rY1

Setting Hi & Lo Level For Second Alarm Output :
Preset as H
Range : H, L



[⇧] Alter the next selection

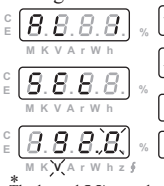
[⇩] Alter the next selection

[◁] No function

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

* The legend P.AL must be set to AL in type of rY2

Values Set-Up For First Comparing Point :
Preset as 1920
Range : 0000 - 9999 Parameter units and decimal point will be changed,automatically



[⇧] Alter the next selection

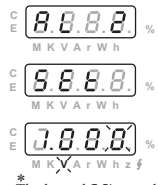
[⇩] Alter the next selection

[◁] Set digits position

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

* The legend P.AL must be set to AL in type of rY1

Values Set-Up For Second Comparing Point :
Preset as 4000
Range : 0000 - 9999 Parameter units and decimal point will be changed,automatically



[⇧] Alter the next selection

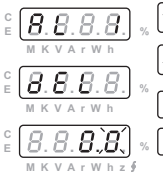
[⇩] Alter the next selection

[◁] Set digits position

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

* The legend P.AL must be set to AL in type of rY2

Time Delay Set-Up For First Relay :
Range : 00 - 99 seconds



[⇧] Alter the next selection

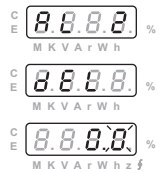
[⇩] Alter the next selection

[◁] Set digits position

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

* The legend P.AL must be set to AL in type of rY1

Time Delay Set-Up For Second Relay :
Range : 00 - 99 seconds



[⇧] Alter the next selection

[⇩] Alter the next selection

[◁] Set digits position

[E] Confirm by pressing and then return to the Subsidiary Flowchart; meanwhile, the selected legend won't flash.

* The legend P.AL must be set to AL in type of rY2

Remarks :

1. The parameter units and decimal point will vary with the CT and PT ratio
2. Comparing values in W, Var and PF are based on absolute value algorithm

*** Examples of setting :**

1. The load of ampere is higher than AC 4A, the relay 1 will delay 3 seconds for triggering.
   The legend P_AL is set to AL in type of rY1, the type of AL1 is set tot 2:A, AL1 HiLo is SET is set to 4.000A, and AL1 DEL is set to 3.
2. The load of Voltage is smaller than AC 200V, the relay 2 will delay one second for triggering.
   The legend P_AL is set to AL in type of rY2, the type of AL2 is set to 1:V, AL2 HiLo is set to L, AL2 SET is set to 200.0V, and AL2 DEL is set to 1.
3. The PT ratio (10 times), the load of voltage is smaller than AC 900V, the relay 1 will delay one second for triggering.
   The legend P_AL is set to AL in type of rY1, the type of AL1 is set to 1:V, AL 1 HiLo is set to L, AL1 SET is set to 900.0V, and AL1 DEL is set to 1.
4. The PT ratio (10 times)/ CT ratio (200 times), the active power is higher than 4000kW, and the relay 1 will start triggering.
   The legend P_AL is set to AL in type of rY1, the type of AL1 is set to 3:W, AL1 HiLo is set to H, AL1 SET is set to 4.000MW, and AL1 DEL is set to 0.

Display	SYS	L1	L2	L3	Accuracy
V (Line-Line)					0.2%
V (Line-Neutral)					0.2%
I					0.2%
kW					0.5%
Kvar					0.5%
kVA					0.5%
Power Factor					0.5%
Frequency					0.05Hz
Import kWh					0.5%
Kvarh (Ind)					0.5%
Export kWh					0.5%
Kvarh (Cap)					0.5%
Harmonic Level					2%
Maximum Demand					0.5%

* Average Value Accuracy : F. S.%

5.2 DESCRIPTION OF SPECIFICATION

Accuracy Range

Voltage.....2~120%

Current.....2~120%

Power Energy.....Voltage : 2~120%, Current : 2~120%

Power Factor.....COS (SIN) 0.5~1

Frequency Range.....45~70Hz

Distortion Level.....31 times

Input Voltage

Voltage (line to line).....8~500V

Voltage (line to neutral).....5~290V

Maximum overload.....750V

Input Burden.....200K

Power Consumption (VA).....0.5VA

Input Current

Current Range.....5A, 1A (Option)

Power consumption (VA).....0.1VA

Isolation.....Phase to phase 600V

Starting Current.....2%F.S.

Power Supply

Auxiliary Power Supply.....AC110/220±15%

Power Consumption (VA).....4.5VA

Frequency Range.....45~65Hz

Display

Type.....high brightness red LED

Digit Height.....0.56", 14.2mm

Display Format.....3 rows of 4 digits

Setting Value, Store Accumulating Value

Memory Method.....EEPROM

Memory Time.....10 years of least

Hour Write In.....per two minutes

Communication

Interface.....RS485 (standard), RS232 (option)

Protocol.....MODBUS, RTU frame

Baud Rate.....1200~38400 programmer

Address Range.....1~255 programmer

Date Format.....N, 8, 1/ N, 8, 2/ O, 8, 1/ E, 8, 1 programmer

Number of Meter.....32 meters

Relay Contact Selection

Relay Contacts.....2 setting points, programmable

Relay Contact Selection.....pulse or alarm contact, programmable

Contact Capacity.....AC250V 1A, DC24V 2A

Max. Pulse Strength.....100 Pulse/ 1KHour

Current Loop Analog Output

Output Points.....2 setting (Option) points, programmable

Loop Powered.....4~20 mA

Voltage Supply.....10~28V

Output Resistance.....600 MAX (24V)

6. COMMUNICATIONS

6.1 Communication Protocol

Use of standard RS 485 bus repeaters is allowed by the connection up to 30 meters.

6.2 Transmission Mode

RTU

6.3 Transmission Method

RS 485 (Half-Duplex)

6.4 Modbus Frame

6.4.1 **Basic Command Framing :** Hexadecimal Code

Start of frame	Address Field	Function Code	Data Field	Error Check	End of Frame

Start of frame : The data is not transmitted by a silent period of at least 4 characters.

Address field : Valid Modbus addresses are in the range 1-255. Address 0 for broadcast command is only valid for Function Code ⇨ 06h, but it doesn't reply to any message.

Function code : 03H ⇨ Read Data
06H ⇨ Write Date

Data field : The start address of a register, reading N Words and writing N values.

Error check : A 16 bit CRC

End of frame : The data is not transmitted by a silent period of at least 4 characters.

6.4.2 **Bit Per Byte :** Setting values refer to page 16, 485→FrAE

Start Bit	Data Bit	Parity	Stop	Frame	Setting values
1	8	None	2	N, 8, 2	0
1	8	Odd	1	O, 8, 1	1
1	8	Even	1	E, 8, 1	2
1	8	None	1	N, 8, 1	3

6.5 **Reading Register Command :** Max. length at 80 Word

Query :

Start of frame	Address Field	Function Code	Start Address Hi	Start Address Lo	Number of Word Hi	Number of Word Lo	Error Check		End of Frame
	01H~FFH	03H	0~nnH	0~nnH	0H	1~nnH	CRC Lo	CRC Hi	
	1 Byte	1 Byte	2 Byte		2 Byte		2 Byte		

Response : (Command is correct)

Start of frame	Address Field	Function Code	Number of Date Byte Count	D0, D1.. Dn (Hi, Lo, Hi, Lo....)	Error Check		End of Frame
	01H~FFH	03H			CRC Lo	CRC Hi	
	1 Byte	1 Byte	1 Byte		2 Byte		

6.6 **Writing Register Command :** A single writing **WORD** command

Query :

Start of frame	Address Field	Function Code	Start Address Hi	Start Address Lo	Value Hi..	Value ..Lo	Error Check		End of Frame
	01H~FFH	06H	0~nnH	0~nnH	Setting Value		CRC Lo	CRC Hi	
	1 Byte	1 Byte	2 Byte		2 or 4 Byte		2 Byte		

Response : (Reply to the writing data if the command is correct)

Query :

Start of frame	Address Field	Function Code	Start Address Hi	Start Address Lo	Value Hi..	Value ..Lo	Error Check		End of Frame
	01H~FFH	06H	0~nnH	0~nnH	Setting Value		CRC Lo	CRC Hi	
	1 Byte	1 Byte	2 Byte		2 or 4 Byte		2 Byte		

6.7 **Message Error :** (A command is error)

Start of frame	Address Field	Function Code	Error Code	Error Check		End of Frame
	01H~FFH	03H		CRC Lo	CRC Hi	
	1 Byte	1 Byte	1 Byte	2 Byte		

Function Code : The received Function Code but the **MSB** is set to 1, an example is like 03H ⇨ 83H

Error Code : 01 : Error Function
02 : Error Data Address
03 : Error Data Value

6.8 **Examples :**

Query :

Field Name	Examples (Hex)
Meter Address	01
Function Code	03
Starting Address Hi	10
Starting Address LO	02
Number of Word Hi	00
Number of Word Lo	04
CRC Lo	E1
CRC Hi	09

Response :

Field Name	Examples (Hex)
Meter Address	01
Function Code	03
Data Byte Count	08
(Address 1002)	
Data (Byte 1)	
Data (Byte 2)	
Data (Byte 3)	
Data (Byte 4)	
(Address 1004)	
Data (Byte 1)	
Data (Byte 2)	
Data (Byte 3)	
Data (Byte 4)	
CRC Lo	
CRC Hi	

6.9 The CRC Calculation :

The CRC is calculated on all bytes of a message from the address to the last data byte inclusively. The CRC field is the result of a CRC calculation performed on the message contents. The meter will not reply to commands with a CRC in error and the host should re-transmit the command after a preset time-out period. If the host receives a string with a CRC in error, the transaction should be transmitted. A message is represented for being from the address field to the data field.

The calculation is performed as follows :

1. Load a CRC register with 0xFFFF.
2. Exclusive-OR the first 8 bytes of the message with the low-order of the CRC register. Put the result in the CRC register.
3. Shift the CRC register one bit to the right, filling the MSB with a zero, and comparing the bit shifted out.
4. Repeat step 3 if the SLSB=0; Exclusive-OR the CRC register with the value A001 Hex, and put the result in the CRC register if the SLSB=1.
5. Repeat steps 3 and 4 until the 8 bits have been performed and tested.
6. Repeat steps 2 to 5 until all bytes have been processed.
7. Swap a message with the low and high order bytes after calculating the CRC register.

The CRC Checking :

The returned CRC register is as unsigned short int.
The starting address and field of the data are transmitted, and the returned CRC register with the low and high byte has been swapped.

```
/*CRC Generation Function with 'C' language*/
/* Msg:*message to calculate CRC upon*/
/* usDatalen:number of bytes in message*/
unsigned int CRC16 (char *Msg, unsigned char usDatalen)
{
   unsigned char uchCRCHi=0xFF;/*CRC high byte*/
   unsigned char uchCRCLo=0xFF; /*CRC low byte*/
   unsigned char uIndex;
   while (usDatalen--)/*pass through message buffer*/
   {
      uIndex=uchCRCHi^*Msg++;/*calculate the CRC*/
      uchCRCHi=uchCRCLO^auchCRCHi[uIndex];
      uchCRCLo=auchCRClo[uIndex];
   }
}
return )uchCRCHi<<8|uchCRCLo);
```



```
static unsigned char auchCRCHi[]={
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,0x01,0xc0,
0x80,0x41,0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x00,0xc1,
0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,0x80,0x41,
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x00,0xc1,
0x81,0x40,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,
0x01,0xc0,0x80,0x41,0x01,0xc0,0x80,0x41,0x00,0xc1,
0x81,0x40,0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,
0x00,0xc1,0x81,0x41,0x01,0xc0,0x80,0x41,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,
0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,
0x80,0x41,0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
0x01,0xc0,0x80,0x41,0x00,0xc1,0x81,0x40,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40,0x00,0xc1,0x81,0x40,
0x01,0xc0,0x80,0x41,0x01,0xc0,0x80,0x41,0x00,0xc1,
0x81,0x40,0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,
0x00,0xc1,0x81,0x40,0x01,0xc0,0x80,0x41,0x01,0xc0,
0x80,0x41,0x00,0xc1,0x81,0x40};
```

```
static unsigned char auchCRCHi[]={
0x00,0xc0,0xc1,0x01,0x03,0x03,0x02,0xc2,0xc6,0x06,
0x07,0xc7,0x05,0xc5,0xc4,0x04,0xcc,0x0c,0x0d,0xcd,
0x0f,0xcf,0xce,0x0e,0x0a,0xca,0xcb,0x0b,0xc9,0x09,
0x08,0xc8,0xd8,0x18,0x19,0xd9,0x1b,0xdb,0xda,0x1a,
0x1e,0xde,0xdf,0x1f,0xdd,0x1d,0x1c,0xdc,0x14,0xd4,
0xd5,0x15,0xd7,0x17,0x16,0xd6,0xd2,0x12,0x13,0xd3,
0x11,0xd1,0xd0,0x10,0xf0,0x30,0x31,0xf1,0x33,0xf4,
0xf2,0x32,0x36,0xf6,0xf7,0x37,0xf5,0x35,0x34,0xf4,
0x3c,0xfc,0xfd,0x3d,0xff,0x3f,0x3e,0xfe,0xfa,0x3a,
0x3b,0xfb,0x39,0xf9,0xf8,0x38,0x28,0xe8,0xe9,0x29,
0xeb,0x2b,0x2a,0xea,0xee,0x2e,0x2f,0xef,0x2d,0xed,
0xec,0x2c,0xe4,0x24,0x25,0xe5,0x27,0xe7,0xe6,0x26,
0x22,0xe2,0xe3,0x23,0xe1,0x21,0x20,0xe0,0xa0,0x60,
0x61,0xa1,0x63,0xa3,0xa2,0x62,0x66,0xa6,0xa7,0x67,
0xa5,0x65,0x64,0xa4,0x6c,0xac,0xad,0x6d,0xaf,0x6f,
0x6e,0xae,0xaa,0x6a,0x6b,0xab,0x69,0xa9,0xa8,0x68,
0x78,0xb8,0xb9,0x79,0xbb,0x7b,0x7a,0xba,0xbe,0x7e,
0x7f,0xbf,0x7d,0xbd,0xbc,0x7c,0xb4,0x74,0x75,0xb5,
0x77,0xb7,0xb6,0x76,0x72,0xb2,0xb3,0x73,0xb1,0x71,
0x70,0xb0,0x50,0x90,0x91,0x51,0x93,0x53,0x52,0x92,
0x96,0x56,0x57,0x97,0x55,0x95,0x94,0x54,0x9c,0x5c,
0x5d,0x9d,0x5f,0x9f,0x9e,0x5e,0x5a,0x9a,0x9b,0x5b,
0x99,0x59,0x58,0x98,0x88,0x48,0x49,0x89,0x4b,0x8b,
0x8a,0x4a,0x4e,0x8e,0x8f,0x4f,0x8d,0x4d,0x4c,0x8c,
0x44,0x84,0x85,0x45,0x87,0x47,0x46,0x86,0x82,0x42,
0x43,0x83,0x41,0x81,0x80,0x40};
```

6.10 Setting Date Address :

Address	Contents	Format	Bytes	Words	Access	Range
0000H	Display Page	Integer	2	1	R/W	0-n (Note1)
0001H	Display Item	Integer	2	1	R/W	0-n (Note2)
0002H	Power on Page	Integer	2	1	R/W	0-n (Note1)
0003H	Power on Item	Integer	2	1	R/W	0-n (Note2)
0004H	User A (Low Column)	Integer	2	1	R/W	0-6
0005H	User B (Mid Column)	Integer	2	1	R/W	0-4
0006H	User C (Hi Column)	Integer	2	1	R/W	0-4
0007H	Second (RTC)	Integer	2	1	R/W	0-59
0008H	Minute (RTC)	Integer	2	1	R/W	0-59
0009H	Hour (RTC)	Integer	2	1	R/W	0-23
000AH	Sys Net	Integer	2	1	R/W	0-3 (Note3)
000BH	Demand Average Times	Integer	2	1	R/W	1-60
000CH	485 Address	Integer	2	1	R/W	1-255
000DH	485 Baud Rate	Integer	2	1	R/W	0-5
000EH	485 Frame	Integer	2	1	R/W	0-3
000FH	Two Word Hi_Lo ‖ Lo_Hi	Integer	2	1	R/W	0-1
0010H	Ct Ratio	Integer	2	1	R/W	1-9999
0011H	Pt Ratio	Integer	2	1	R/W	1-9999
0012H	Password	Integer	2	1	R/W	0-9999
0013H	Reset High	Integer	2	1	W	0-1
0014H	Reset Energy	Integer	2	1	W	0-1
0015H	Reset Demand	Integer	2	1	W	0-1
0016H	Out1 Type	Integer	2	1	W/R	0-4
0017H	Out1 Hi Set	Integer	2	1	W/R	0-9999 (Note4)
0018H	Out2 Type	Integer	2	1	W/R	0-4
0019H	Out2 Hi Set	Integer	2	1	W/R	0-9999 (Note4)
001AH	Relay1 (Pulse or Alarm)	Integer	2	1	W/R	0-1
001BH	Relay2 (Pulse or Alarm)	Integer	2	1	W/R	0-1
001CH	Relay1 (Pulse Type)	Integer	2	1	W/R	0-2
001DH	Relay2 (Pulse Type)	Integer	2	1	W/R	0-2
001EH	Relay1 (Pulse/ 1KHour)	Integer	2	1	W/R	0-2
001FH	Relay2 (Pulse/ 1KHour)	Integer	2	1	W/R	0-2
0020H	Relay1 (Alarm Type)	Integer	2	1	W/R	0-6
0021H	Relay2 (Alarm Type)	Integer	2	1	W/R	0-6
0022H	Relay1 (Alarm HiLo Set)	Integer	2	1	W/R	0-1
0023H	Relay2 (Alarm HiLo Set)	Integer	2	1	W/R	0-1
0024H	Relay1 (Alarm Set Value)	Integer	2	1	W/R	0-9999 (Note4)
0025H	Relay2 (Alarm Set Value)	Integer	2	1	W/R	0-9999 (Note4)
0026H	Relay1 (Alarm Delay)	Integer	2	1	W/R	0-99 S
0027H	Relay2 (Alarm Delay)	Integer	2	1	W/R	0-99 S
0028H	Relay Status)	Integer	2	1	R	0-3 (Note5)

Note 1 : The maximum value varies with any setting in the SYS Net.

Note 2 : The maximum value varies with the changed Display Page, and the Display Item will be set to 0 automatically after altering the Display Page. Please refer to the Configuration Menus on page 6-9.

Note 3 : The Display Page and Item will be set to 0 automatically after altering the SYS Net.

Note 4 : Don't set any electric unit and decimal point, but you must conform to any presetting value in the electric unit and decimal point. A example of 2400, it represents 240.0

Note 5 : Status of Relay On / Off : 0:ry1 off, ry2 off, 1:ry1 on, ry2 off. 2:ry1 off, ry2 on. 3ry1 on, ry2 on.

6.10.1 Data Set-up :

Contents	Description
Display Page	Selection for the required function flowchart (Such as 1PPQS, SYSPQS, 1PENGY, 3PENGY, THD and so on). Writing data, the displaying screen will be changed automatically, and the Display Item also equals zero. SysNet 3P4L: 0-8, 3P3l : 0-8, 1P3L : 0-8, 1P2L : 0-6.
Display Item	Selection for the required function flowchart. Writing data, the displaying screen will be changed automatically, and the Display Item also equals zero. If the display range shows 1P PQS : 0-5, please refer to page 8-11.
Power on Page	Preset the required displaying flowchart on screen after the power-on; After writing data, the Power on Item Has to be re-selected.
Power on Item	Preset the required displaying flowchart on screen after the power-on; After writing data, this meter has to be switched off so that this function will be performed by re-switching on.
User A (Bottom Line)	Enter the USER menu in the Main Function Mode, to set the number from (0 to 6) which represents the electrical units. 0 : VA, 1 : V, 2 : A, 3 : W, 4 : Var, 5 : PF, 6 : Hz.
User B (Mid Line)	Enter the USER menu in the Main Function Mode, to set the number from (0 to 6) which represents electrical units. 0 : VA, 1 : V, 2 : A, 3 : W, 4 : Var.
User C (Top Line)	Enter the USER menu in the Main Function Mode, to set the number from (0 to 6) which represents electrical units. 0 : VA, 1 : V, 2 : A, 3 : W, 4 : Var.
Second (RTC)	The real time clock in second set from 0 to 59.
Minute (RTC)	The real time clock in minute set from 0 to 59.
Hour (RTC)	The real time clock in hour set from 0 to 23.
Sys Net	The system network is set to 0:3P4L, 1:3P3L, 2:1P3L, 3:1P2L. **Note :** The function of the **Display Page - Item, Power on Page - Item** will be set to 0 automatically after altering **SysNet.**
Demand Average Time	Average demand time setting : 1-60 min.
485 Address	The RS 485 metering addresses are in the range from 1-255.
485 Baud Rate	The baud rate is set to 0:1200, 1:2400, 2:4800, 3:9600, 4:19200, 5:38400.
485 Frame	The RS 485 frame is set to 0:n82, 1:081, 2:e81, 3:n81.
Two Words Hi_Lo ‖ Lo_Hi	The two words (Float or Long) transmission is set to, 1:HiWord–LoWord, 0:LoWord–HiWord.
Ct Ratio	Based on the ratio of primary to secondary value. Set from 1-9999.
Pt Ratio	Based on the ratio of primary to secondary value. Set from 1-9999.
Password	Enter the function flowchart to set the desired pass code.
Reset High	Clear the stored value in High and Low setting. 1:clear the preset value.
Reset Energy	Clear the stored demand value. 1:clear the preset value.
Reset Demand	Clear the stored demand value. 1:clear the preset value.
Out1 Type	First setting relay corresponds to the selected unit. 0:VA, 1:V, 2:A, 3:W, 4:Var, 5:PF, 6:Hz.
Out1 Hi Set	Peak value setting in first output corresponds to the analog output. The setting value begins from 0-9999 and the parameter unit is auto-adjustment.
Out2 Type	Second setting relay corresponds to the selected unit. 0:VA, 1:V, 2:A, 3:W, 4:Var, 5:PF, 6:Hz.
Out2 Hi Set	Peak value setting in second output corresponds to the analog output. The setting value begins from 0-9999 and the parameter unit is auto-adjustment.
Relay1 (Pulse or Alarm)	The contact method in the first relay 0:Pulse, 1:Alarm.
Relay2 (Pulse or Alarm)	The contact method in the second relay 0:Pulse, 1:Alarm.
Relay1 (Pulse Type)	First relay setting in Pulse mode corresponds to the type of energy. 0:VAH, 1:WH, 2:VarH.
Relay2 (Pulse Type)	Second relay setting in Pulse mode corresponds to the type of energy. 0:VAH, 1:WH, 2:VarH.
Relay1 (Pulse/ 1KHour)	The strength of the pulse in the first relay setting (pulse/1khour). 0:1P, 1:10P, 2:100P.
Relay2 (Pulse/ 1KHour)	The strength of the pulse in the second relay setting (pulse/1khour). 0:1P, 1:10P, 2:100P.
Relay1 (Alarm Type)	The first relay in Alarm mode corresponds to the electrical units.
Relay2 (Alarm Type)	The second relay in Alarm mode corresponds to the electrical units.
Relay1 (Alarm HiLo Set)	Setting the max. threshold point (Hi) or the min. threshold point (Lo). 0:Lo, 1:Hi.
Relay2 (Alarm HiLo Set)	Setting the max. threshold point (Hi) or the min. threshold point (Lo). 0:Lo, 1:Hi.
Relay1 (Alarm Set Value)	Setting the alarm threshold value in the first relay.
Relay2 (Alarm Set Value)	Setting the alarm threshold value in the second relay.
Relay1 (Alarm Delay)	Setting time delay corresponds to the first relay triggering. (Set from 0-99 sec.)
Relay2 (Alarm Delay)	Setting time delay corresponds to the second relay triggering. (Set from 0-99 sec.)

6.11 Modbus Data Address :

Address	Contents	Format	Bytes	Words	Access	Range
1000H	I_R	Float	4	2	R	A
1002H	V_RN	Float	4	2	R	V
1004H	V_RS	Float	4	2	R	V
1006H	VA_R	Float	4	2	R	VA
1008H	W_R	Float	4	2	R	W
100AH	Var_R	Float	4	2	R	Var
100CH	PF_R	Float	4	2	R	PF
100EH	HZ_R	Float	4	2	R	HZ
1010H	VAH_R	Float	4	2	R	VAH
1012H	WH_R (Import)	Float	4	2	R	WH
1014H	WH_R (Export)	Float	4	2	R	WH
1016H	WH_R (Total)	Float	4	2	R	WH
1018H	VarH_R (Ind)	Float	4	2	R	VarH
101AH	VarH_R (Cap)	Float	4	2	R	VarH
101CH	VarH_R (Total)	Float	4	2	R	VarH
101EH	I_S L2	Float	4	2	R	A
1020H	V_SN	Float	4	2	R	V
1022H	V_ST	Float	4	2	R	V
1024H	VA_S	Float	4	2	R	VA
1026H	W_S	Float	4	2	R	W
1028H	Var_S	Float	4	2	R	Var
102AH	PF_S	Float	4	2	R	PF
102CH	HZ_S	Float	4	2	R	HZ
102EH	VAH_S	Float	4	2	R	VAH
1030H	WH_S (Import)	Float	4	2	R	WH
1032H	WH_S (Export)	Float	4	2	R	WH
1034H	WH_S (Total)	Float	4	2	R	WH
1036H	VarH_S (Ind)	Float	4	2	R	VarH
1038H	VarH_S (Cap)	Float	4	2	R	VarH
103AH	VarH_S (Total)	Float	4	2	R	VarH
103CH	I_T L3	Float	4	2	R	A
103EH	V_TN	Float	4	2	R	V
1040H	V_TR	Float	4	2	R	V
1042H	VA_T	Float	4	2	R	VA
1044H	W_T	Float	4	2	R	W
1046H	Var_T	Float	4	2	R	Var
1048H	PF_T	Float	4	2	R	PF
104AH	HZ_T	Float	4	2	R	HZ
104CH	VAH_T	Float	4	2	R	VAH
1050H	WH_T (Import)	Float	4	2	R	WH
1052H	WH_T (Export)	Float	4	2	R	WH
1052H	WH_T (Total)	Float	4	2	R	WH
1054H	VarH_T (Ind)	Float	4	2	R	VarH
1056H	VarH_T (Cap)	Float	4	2	R	VarH
1058H	VarH_T (Total)	Float	4	2	R	VarH

1P2L : The measured parameter values on single phase in section L1. The value (SYS) in system network can be also contained in section L1.
1P2L : The measured parameter values on single phase in section L1 and L2. The values (SYS) in system network can be also contained in section L1 and L2.
SYS VLL1 V+L2 V.
3P3L, 3P4L : The measured parameter values on single phase in section L1, L2 and L3. The values (SYS) in system network can be also contained in section L1, L2 and L3. SYS V:L1 V+L2 V+L3 V.

Address	Contents	Format	Bytes	Words	Access	Unit
105AH	A	Float	4	2	R	A
105CH	V	Float	4	2	R	V
105EH	VL	Float	4	2	R	V
1060H	VA	Float	4	2	R	VA
1062H	W	Float	4	2	R	W
1064H	Var	Float	4	2	R	Var
1066H	PF	Float	4	2	R	PF
1068H	HZ	Float	4	2	R	HZ
106AH	VAH	Float	4	2	R	VAH
106CH	WH (Import)	Float	4	2	R	WH
106EH	WH (Export)	Float	4	2	R	WH
1070H	WH (Total)	Float	4	2	R	WH
1072H	VarH (Ind)	Float	4	2	R	VarH
1074H	VarH (Cap)	Float	4	2	R	VarH
1076H	VarH (Total)	Float	4	2	R	VarH
1078H	AN	Float	4	2	R	A

107AH	Maximum I_R L1	Float	4	2	R	A
107CH	Maximum V_RN OR RS	Float	4	2	R	V
107EH	Maximum W_R	Float	4	2	R	W
1080H	Maximum I_S L2	Float	4	2	R	A
1082H	Maximum V_SN OR V_ST	Float	4	2	R	V
1084H	Maximum W_S	Float	4	2	R	W
1086H	Maximum I_T	Float	4	2	R	A
1088H	Maximum V_TN OR V_TR	Float	4	2	R	V
108AH	Maximum W_T	Float	4	2	R	W
108CH	Maximum A (⇨SYS)	Float	4	2	R	A
108EH	Maximum V	Float	4	2	R	V
1090H	Maximum W	Float	4	2	R	W

1092H	Maximum I_R L1	Float	4	2	R	A
1094H	Maximum V_RN OR V RS	Float	4	2	R	V
1096H	Maximum W_R	Float	4	2	R	W
1098H	Maximum I_S L2	Float	4	2	R	A
109AH	Maximum V_SN OR V_ST	Float	4	2	R	V
109CH	Maximum W_S	Float	4	2	R	W
109EH	Maximum I_T L3	Float	4	2	R	A
10A0H	Maximum V_TN OR V_TR	Float	4	2	R	V
10A2H	Maximum W_T	Float	4	2	R	W
10A4H	Maximum A (⇨SYS)	Float	4	2	R	A
10A6H	Maximum V	Float	4	2	R	V
10A8H	Maximum W	Float	4	2	R	W

Maximum, Minimum : Ln V : 3P3L : Line-Volts, 3P4L, 1P2L, 1P3L : Phase-Volts.
SYS V : 3P3L : Ave Line-Volts, 3P4L, 1P2L : Ave Phase-Volts, 1P3L : L1B Z+ L2V.

6.11.1 Modbus Date Address :

Address	Contents	Format	Bytes	Words	Access	Unit
10AAH	Demand VA (⇨SYS)	Float	4	2	R	VA
10ACH	Maximum Demand VA	Float	4	2	R	VA
10AEH	Demand W	Float	4	2	R	W
10B0H	Maximum Demand W	Float	4	2	R	W
10B2H	Demand Var	Float	4	2	R	Var
10B4H	Maximum Demand Var	Float	4	2	R	Var
10B6H	Demand A	Float	4	2	R	A
10B8H	Maximum Demand A	Float	4	2	R	A

10BAH	I_R THD L1	Float	4	2	R	%
10BCH	V_RN OR THD	Float	4	2	R	%
10BEH	V_RS THD	Float	4	2	R	%
10C0H	I_S THD L2	Float	4	2	R	%
10C2H	V_SN THD	Float	4	2	R	%
10C4H	V_ST THD	Float	4	2	R	%
10C6H	I_T THD L2	Float	4	2	R	%
10C8H	V_TN THD	Float	4	2	R	%
10CAH	V_TR THD	Float	4	2	R	%
10CCH	A THD (⇨SYS)	Float	4	2	R	%
10CEH	A THD	Float	4	2	R	%

Remarks :

V THD: 3P3L:Line Volts-Average of THD , 3P4L, 1P3L, 1P2L : Phase Volts-Average of THD

** The THD function required will be shown on screen

Descriptions :

Legend	Electric Parameter Units	Legend	Electric Parameter Units
I_R	R(L1):Phase-Amps	V_RN	R(L1):Phase-Volts
V_RS	RS (L1-2):Line-Volts	VA_R	R(L1):VA
W_R	R(L1):Watts	Var_R	R(L1):Var
PF_R	R(L1):Power Factor	Hz_R	R(L1):Frequency
VAH_R	R(L1):Apparent Energy(kVah)	WH_R (Total)	R(L1):kWh
VarH_R (Total)	R(L1):kVArh	S(L2),T (L3)..	
A	Total system amps	W	Total system volts on 3P and 1P
VL	Total system volts (L-L)-on 3 phase	W	Total system wats
WH (Total)	Total system kWh	VarH (Total)	Total system kVAh
An	Total system amps (Neural-Phase) on 3P4W		
Maximum I_R	R(L1): Max Amps	Maximum VRN or VRS	Max Amps
Maximum Demand W	System max. demand for kW	Demand W	kW demand
I_R THD	THD component (%) of amps	V THD	THD component (%) of system volts

6.12 Modbus Data Address (Long Integers) :

Address	Contents	Format	Bytes	Words	Access	Unit
100H	Hour Scale	Float	4	2	R	Remarks
102H	VAH_R L1	Float	4	2	R	8 Digits
104H	WH_R (Import)	Float	4	2	R	"
106H	WH_R (Export)	Float	4	2	R	"
108H	WH_R (Total)	Float	4	2	R	"
10AH	VarH_R (Ind)	Float	4	2	R	"
10CH	VarH_R (Cap)	Float	4	2	R	"
10EH	VarH_R (Total)	Float	4	2	R	"
100H	VAH_S L2	Float	4	2	R	"
112H	WH_S (Import)	Float	4	2	R	"
114H	WH_S (Export)	Float	4	2	R	"
116H	WH_S (Total)	Float	4	2	R	"
118H	VarH_S (Ind)	Float	4	2	R	"
11AH	VarH_S (Cap)	Float	4	2	R	"
11CH	VarH_S (Total)	Float	4	2	R	"
11EH	VAH_T L3	Float	4	2	R	"
120H	WH_T (Import)	Float	4	2	R	"
122H	WH_T (Export)	Float	4	2	R	"
124H	WH_T (Total)	Float	4	2	R	"
126H	VarH_T (Ind)	Float	4	2	R	"
128H	VarH_T (Cap)	Float	4	2	R	"
12AH	VarH_T (Total)	Float	4	2	R	"
12CH	VAH (⇨SYS)	Float	4	2	R	"
12EH	WH_T (Import)	Float	4	2	R	"
130H	WH_T (Export)	Float	4	2	R	"
132H	WH_T (Total)	Float	4	2	R	"
134H	VarH_T (Ind)	Float	4	2	R	"
136H	VarH_T (Cap)	Float	4	2	R	"
138H	VarH_T (Total)	Float	4	2	R	"

Remarks : Max. values reach 999999999. The decimal point and M/K unit will vary with the following calculating formula.

Hour Scale : The values will be re-calculated if the ratio of primary to secondary value has been changed.

Displaying Value = The received signal*10 ^ (Hour Scale-3).

Example : The address 132H represents 12345678, and the Hour Scale is based on the figure in 5; therefore, the hour reading is calculated as follows. The basic unit in hour reading is WH. If the Hour Scale is at 5, the calculation will be got by (5-3=2). Relatively, the following calculation is also got by this formula.

2-3=-1, represents 0.1 KWH or 2-6=-4, represents 0.0001MWH.

6.12.1 Modbus Data Address (Long Integers) :

Address	Contents	Format	Bytes	Words	Access	Unit
1F8H	V Unit	Unsigned Int	2	1	R	See 8.13.1
1F9H	V Dot	Unsigned Int	2	1	R	See 8.13.1
1FAH	A Unit	Unsigned Int	2	1	R	See 8.13.1
1FBH	A Dot	Unsigned Int	2	1	R	See 8.13.1
1FCH	Power Unit	Unsigned Int	2	1	R	See 8.13.1
1FDH	Power Dot	Unsigned Int	2	1	R	See 8.13.1
1FEH	Energy Unit (Hour)	Unsigned Int	2	1	R	See 8.13.1
1FFH	Energy Dot (Hour)	Unsigned Int	2	1	R	See 8.13.1
200H	I_R L1	Unsigned Int	2	1	R	A
201H	V_RN	Unsigned Int	2	1	R	V
202H	V_RS	Unsigned Int	2	1	R	V
203H	VA_R	Unsigned Int	2	1	R	VA
204H	W_R	Signed Int	2	1	R	W
205H	Var_R	Signed Int	2	1	R	Var
206H	PF_R	Signed Int	2	1	R	PF
207H	HZ_R	Unsigned Int	2	1	R	HZ
208H	VAH_R Hi word	Unsigned Int	2	1	R	VAH
209H	VAH_R Lo word	Unsigned Int	2	1	R	VAH
20AH	WH_R (Import) Hi word	Unsigned Int	2	1	R	WH
20BH	WH_R (Import) Lo word	Unsigned Int	2	1	R	WH
20CH	WH_R (Export) Hi word	Unsigned Int	2	1	R	WH
20DH	WH_R (Export) Lo word	Unsigned Int	2	1	R	WH
20EH	WH_R (Total) Hi word	Unsigned Int	2	1	R	WH
20FH	WH_R (Total) Lo word	Unsigned Int	2	1	R	WH
210H	VarH_R (Ind) Hi word	Unsigned Int	2	1	R	VarH
211H	VarH_R (Ind) Lo word	Unsigned Int	2	1	R	VarH
212H	VarH_R (Cap) Hi word	Unsigned Int	2	1	R	VarH
213H	VarH_R (Cap) Lo word	Unsigned Int	2	1	R	VarH
214H	VarH_R (Total) Hi word	Unsigned Int	2	1	R	VarH
215H	VarH_R (Total) Lo word	Unsigned Int	2	1	R	VarH
216H	I_S L2	Unsigned Int	2	1	R	A
217H	V_SN	Unsigned Int	2	1	R	V
218H	V_ST	Unsigned Int	2	1	R	V
219H	VA_S	Unsigned Int	2	1	R	VA
21AH	W_S	Signed Int	2	1	R	W
21BH	Var_S	Signed Int	2	1	R	Var
21CH	PF_S	Signed Int	2	1	R	PF
21DH	HZ_S	Unsigned Int	2	1	R	HZ
21EH	VAH_S	Unsigned Int	2	1	R	VAH
21FH	VAH_S	Unsigned Int	2	1	R	VAH
220H	WH_S (Import) Hi word	Unsigned Int	2	1	R	WH
221H	WH_S (Import) Lo word	Unsigned Int	2	1	R	WH
222H	WH_S (Export) Hi word	Unsigned Int	2	1	R	WH
223H	WH_S (Export) Lo word	Unsigned Int	2	1	R	WH
224H	WH_S (Total) Hi word	Unsigned Int	2	1	R	WH
225H	WH_S (Total) Lo word	Unsigned Int	2	1	R	WH
226H	VarH_S (Ind) Hi word	Unsigned Int	2	1	R	VarH
227H	VarH_S (Ind) Lo word	Unsigned Int	2	1	R	VarH
228H	VarH_S (Cap) Hi word	Unsigned Int	2	1	R	VarH
229H	VarH_S (Cap) Lo word	Unsigned Int	2	1	R	VarH
22AH	VarH_S (Total) Hi word	Unsigned Int	2	1	R	VarH
22BH	VarH_S (Total) Lo word	Unsigned Int	2	1	R	VarH

22CH	I_T	Unsigned Int	2	1	R	A
22DH	V_TN	Unsigned Int	2	1	R	V
22EH	V_TR	Unsigned Int	2	1	R	V
22FH	VA_T	Unsigned Int	2	1	R	VA
230H	W_T	Signed Int	2	1	R	W
231H	Var_T	Signed Int	2	1	R	Var
232H	PF_T	Signed Int	2	1	R	PF
233H	HZ_T	Unsigned Int	2	1	R	HZ
234H	VAH_T	Unsigned Int	2	1	R	VAH
235H	VAH_T	Unsigned Int	2	1	R	VAH
236H	WH_T (Import) Hi word	Unsigned Int	2	1	R	WH
237H	WH_T (Import) Lo word	Unsigned Int	2	1	R	WH
238H	WH_T (Export) Hi word	Unsigned Int	2	1	R	WH
239H	WH_T (Export) Lo word	Unsigned Int	2	1	R	WH
23AH	WH_T (Total) Hi word	Unsigned Int	2	1	R	WH
23BH	WH_T (Total) Lo word	Unsigned Int	2	1	R	WH
23CH	VarH_T (Ind) Hi word	Unsigned Int	2	1	R	VarH
23DH	VarH_T (Ind) Lo word	Unsigned Int	2	1	R	VarH
23EH	VarH_T (Cap) Hi word	Unsigned Int	2	1	R	VarH
23FH	VarH_T (Cap) Lo word	Unsigned Int	2	1	R	VarH
240H	VarH_T (Total) Hi word	Unsigned Int	2	1	R	VarH
241H	VarH_T (Total) Lo word	Unsigned Int	2	1	R	VarH
242H	ΣA (⇨SYS)	Unsigned Int	2	1	R	A
243H	ΣV	Unsigned Int	2	1	R	V
244H	ΣV	Unsigned Int	2	1	R	V
245H	ΣVA	Unsigned Int	2	1	R	VA
246H	ΣW	Signed Int	2	1	R	W
247H	ΣVar	Signed Int	2	1	R	Var
248H	ΣPF	Signed Int	2	1	R	PF
249H	ΣHZ	Unsigned Int	2	1	R	HZ
24AH	ΣVAH Hi word	Unsigned Int	2	1	R	VAH
24BH	ΣVAH Lo word	Unsigned Int	2	1	R	VAH
24CH	ΣWH (Import) Hi word	Unsigned Int	2	1	R	WH
24DH	ΣWH (Import) Lo word	Unsigned Int	2	1	R	WH
24EH	ΣWH (Export) Hi word	Signed Int	2	1	R	WH
24FH	ΣWH (Export) Lo word	Signed Int	2	1	R	WH
250H	ΣWH (Total) Hi word	Signed Int	2	1	R	WH
251H	ΣWH (Total) Lo word	Unsigned Int	2	1	R	WH
252H	ΣVarH (Ind) Hi word	Unsigned Int	2	1	R	VarH
253H	ΣVarH (Ind) Lo word	Unsigned Int	2	1	R	VarH
254H	ΣVarH (Cap) Hi word	Unsigned Int	2	1	R	VarH
255H	ΣVarH (Cap) Lo word	Unsigned Int	2	1	R	VarH
256H	ΣVarH (Total) Hi word	Unsigned Int	2	1	R	VarH
257H	ΣVarH (Total) Lo word	Unsigned Int	2	1	R	VarH
258H	ΣAn	Unsigned Int	2	2	R	A

SYS net : 1P2L : The measure parameter values on single phase in section L1. The values Σ (SYS) in system network can also be contained in section L1. (Without containing Line-Volts)

1P3L : The measured parameter values on single phase in section L1 and L2. The values Σ(SYS) in system network can also be contained in section L1 and L2. SYS V, L1 V+L2V

3P3L, 3P4L : The measured parameter values on single phase in section L1, L2 and L3. The values Σ(SYS) in system network can also be contained in section L1, L2 and L3.

259H	Maximum I_R L1	Unsigned Int	2	1	R	A
25AH	Maximum V_RN OR RS	Unsigned Int	2	1	R	V
25BH	Maximum W_R	Signed Int	2	1	R	W
25CH	Maximum I_S L2	Unsigned Int	2	1	R	A
25DH	Maximum V_SN OR V_ST	Unsigned Int	2	1	R	V
25EH	Maximum W_S	Signed Int	2	1	R	W
25FH	Maximum I_T	Unsigned Int	2	1	R	A
260H	Maximum V_TN OR V_TR	Unsigned Int	2	1	R	V
261H	Maximum W_T	Signed Int	2	1	R	W
262H	Maximum SA (Σ⇨SYS)	Unsigned Int	2	1	R	A
263H	Maximum ΣV OR ΣVL	Unsigned Int	2	1	R	V
264H	Maximum ΣW	Signed Int	2	1	R	W
265H	Maximum I_R L1	Unsigned Int	2	1	R	A
266H	Maximum V_RN OR RS	Unsigned Int	2	1	R	V
267H	Maximum W_R	Signed Int	2	1	R	W
268H	Maximum I_S L2	Unsigned Int	2	1	R	A
269H	Maximum V_SN OR V_ST	Unsigned Int	2	1	R	V
26AH	Maximum W_S	Signed Int	2	1	R	W
26BH	Maximum I_T	Unsigned Int	2	1	R	A
26CH	Maximum V_TN OR V_TR	Unsigned Int	2	1	R	V
26DH	Maximum W_T	Signed Int	2	1	R	W
26EH	Maximum SA (Σ⇨SYS)	Unsigned Int	2	1	R	A
26FH	Maximum ΣV OR ΣVL	Unsigned Int	2	1	R	V
270H	Maximum ΣW	Signed Int	2	1	R	W
271H	Demand ΣVA (Σ⇨SYS)	Unsigned Int	2	1	R	VA
272H	Maximum Demand ΣVA	Unsigned Int	2	1	R	VV
273H	Demand ΣW	Signed Int	2	1	R	W
274H	Maximum Demand ΣW	Signed Int	2	1	R	W
275H	Demand ΣVar	Signed Int	2	1	R	Var
276H	Maximum Demand ΣVar	Signed Int	2	1	R	Var
277H	Demand ΣA	Unsigned Int	2	1	R	A
278H	Maximum Demand ΣA	Unsigned Int	2	1	R	A
279H	I_R THD L1	Unsigned Int	2	1	R	%
27AH	V_RN OR THD	Unsigned Int	2	1	R	%
27BH	V_RS THD	Unsigned Int	2	1	R	%
27CH	I_S THD L2	Unsigned Int	2	1	R	%
27DH	V_SN THD	Unsigned Int	2	1	R	%
27EH	V_ST THD	Unsigned Int	2	1	R	%
27FH	I_T THD L2	Unsigned Int	2	1	R	%
280H	V_TN THD	Unsigned Int	2	1	R	%
281H	V_TR THD	Unsigned Int	2	1	R	%
282H	ΣA THD (Σ⇨SYS)	Unsigned Int	2	1	R	%
283H	ΣA THD	Unsigned Int	2	1	R	%

Maximum-Minimum : Lx V : 3P3L : Line Volts, 3P4L-1P2L-1P3L : Phase Volts
SYS V : 3P3L : Ave Line Volts, 3P4L-1P2L : Ave Phase Volts,
1P3L : L1V + L2V.

**The THD function on request will be shown on screen.

6.13 Description Of Decimal Point And Unit :

The integer data derives from the primary value of PT or CT, and then decides to set the decimal point position and unit.

**The received readings on screen would be accurate after finishing setting CT & PT ratio.

Data Address	Contents	Descriptions
1F8H	V Unit	Display a unit of volt. 0 : None, 3 : K, 6 : M, 9 : G.
1F9H	V Dot	Display decimal point position for volt. 0 : None, 1 : a decimal point, analogical example of next decimal point position.
Display values in volt are suitable for phase volt, line volts, peak & valley voltage and so on.		
1FAH	A Unit	Display a unit of amp. 0 : None, 3 : K, 6 : M, 9 : G.
1FBH	A Dot	Display decimal point position for amp. 0 : None, 1 : a decimal point, analogical example of next decimal point position.
Display values in amp are suitable for amp, amp on neutral phase, peak & valley current, amp demand and so on.		
1FCH	Power Unit	Display parameter units. 0 : None, 3 : K, 6 : M, 9 : G.
1FDH	Power Dot	Display decimal point position. 0 : None, 1 : a decimal point, analogical example of next decimal point position.
Display values in VA, W and Var are suitable for VA-W-Var-peak & valley kW-Var demand, Var demand and so on.		
1FEH	Energy Unit	Display energy hour unit. 0 : None, 3 : K, 6 : M, 9 : G.
1FFH	Energy Dot	Display decimal point position. 0 : None, 1 : a decimal point, analogical example of next decimal point position.
Display values are suitable for VAH, WH, VarH and so on.		

Other Parameter Units :
PF : Fixed decimal point position at 3 digits.
Hz : Fixed decimal point position at 2 digits.
THD : Fixed decimal point position at 1 digits.

Hour Scaling : The accumulated method is like Long Integers, which consists of Hi word and Lo word for transmitting 8 digits of values, and these values derives from (Hi word x 65536 + Lo word). Please refer to page 35.

** An example is as follows : The unit is 6, represents the unit.**

Examples : 11.4KV/ 114V-100/ 5A.3P4W.
PT Ratio : 100 times, CT Ratio : 20 times.
V Unit : 3. V Dot : 2. A Unit : 0. A Dot : 2. Power Unit : 6. Power Dot : 3.
Energy Unit : 3. Energy Dot : 0.
If the fed volt is at 11.4kV, the fed amp is at 65A, the fed power factor is at 0.95, and the fed frequency is at 60, and therefore, the values in VA derives from 11.4KV x 65A x 3 = 2223000 = 2.223MVA = 2223kVA. And the values in W derives from VA x PF = 223000 x 0.95 = 2111850.
If the values in WH are at 1234567KWH, the RS485 receives the following values :
V : 1140. A : 6500. HZ : 6000.
Detailed explanations for the above values are below :
V : 11.4KV, Unit in K (V unit = 3), Decimal point at 2 digits (V Dot = 2)
A : 65.00A (A Unit = 0), Decimal point at 2 digits (A Dot = 2)
VA : 2.223 MVA or 2223 KVA
Unit in M (decimal point at 3 digits) or Unit in K (without decimal point)
W : 2.111MW or 2111KW. Please refer to the description of VA
Unit in K (Energy Unit = 3), without decimal point (Energy Dot = 0)
PF : 0.950. Decimal point at 3 digits
Hz : 60.00 Hz Decimal point at 2 digits

Notice : The Unsigned Int is non-symbol, but the Signed Int is a value with positive / negative. The values will be measured correctly if the corresponsive signals are matched. Furthermore, some parameter units (kW, Var, Pf) display positive or negative.

Examples : PF = 0.95 : RS 485 values : 950 : PF = -0.95 : RS 485 values : -(65536 - 64586) = -950

MUMBAI

TEST CERTIFICATE

MULTIFUNCTION POWER METER

This Test Certificate warrantees that the product has been inspected and tested in accordance with the published specifications.

The instrument has been calibrated by using equipment which has already been calibrated to standards traceable to national standards.

MODEL NO. **KM 6300**

SERIAL NO. _____

DATE: _____

ISO 9001
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QC
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WARRANTY

Each “KUSAM-MECO” product is warranted to be free from defects in material and workmanship under normal use & service. The warranty period is one year (12 months) and begins from the date of despatch of goods. In case any defect occurs in functioning of the instrument, under proper use, within the warranty period, the same will be rectified by us free of charges, provided the to and fro freight charges are borne by you.

This warranty extends only to the original buyer or end-user customer of a “KUSAM-MECO” authorized dealer.

This warranty does not apply for damaged Ic’s, fuses, burnt PCB's, disposable batteries, carrying case, test leads, or to any product which in “KUSAM-MECO’s” opinion, has been misused, altered, neglected, contaminated or damaged by accident or abnormal conditions of operation or handling.

“KUSAM-MECO” authorized dealer shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of “KUSAM-MECO”.

“KUSAM-MECO’s” warranty obligation is limited, at option, free of charge repair, or replacement of a defective product which is returned to a “KUSAM-MECO” authorized service center within the warranty period.

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